RAILROAD MAN'S MAGAZINE

OCTOBER

PRICE 15 CENTS

The fair skin
of a Child
is the
foundation
of
Womanly
Beauty

A Word to Mothers

The beauty and freshness of a child largely depends upon the condition of its skin, which is so tender and sensitive that only constant and unremitting care can keep it free from irritation.

The first necessity and safeguard in these matters is a soap that will act like balm upon the dainty skin, that soothes while it cleanses, is kind to the skin, and of a gentle emollient daintiness. No soap answers to this description so completely as

Pears' Soap

No soap is so comforting, so pure or so perfect in its hygienic influence. Bad soaps injure the skin and worry the child. Pears softens, preserves and beautifies.

The skin of a child is kept sweet, wholesome and healthy, and retains its softness and beauty to later years by the regular use of Pears,

The Great English Complexion Soap

"All rights secured"

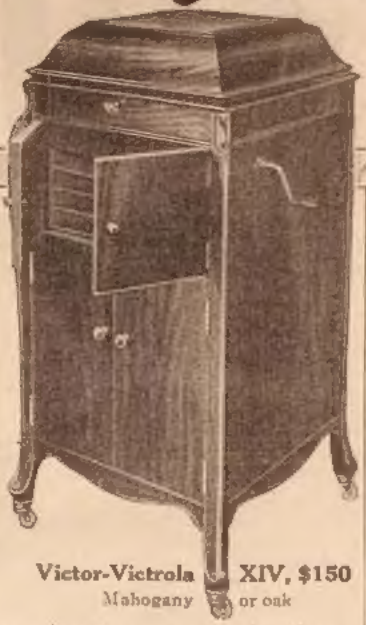
OF ALL SCENTED SOAPS PEARS' OTTO OF ROSE IS THE BEST.

Three new styles

Victor-Victrola XI, $100
Mahogany or oak

Victor-Victrola X, $75
Mahogany or oak

Other styles $15 to $200



Victor-Victrola XIV, $150
Mahogany or oak

The greatest feature about these new instruments is the unequaled tone which has given the Victor-Victrola its supremacy among musical instruments.

There's nothing new about that of course, for this wonderful tone characterizes every Victor-Victrola.

The newness of these three instruments is in the design, and the improvements are really astonishing.

More beautiful, more artistic, more complete—and with no increase in price.

The greatest values ever offered in this greatest of all musical instruments.

Any Victor dealer in any city in the world will gladly show you these instruments and play any music you wish to hear.

Victor Talking Machine Co., Camden, N. J., U. S. A.

Berliner Gramophone Co., Montreal, Canadian Distributors

Always use Victor Machines with Victor Records and Victor Needles—*the combination*. There is no other way to get the unequaled Victor tone.

Victor-Victrola

New Victor Records are on sale at all dealers on the 28th of each month

Williams'

PATENTED

Holder Top Shaving Stick

Williams' Famous Shaving Stick, with all its rich, creamy, refreshing lather, in a new form that adds ease and comfort to the daily shave.

The Holder Top enables you to grasp the stick firmly by the nickeled cap and to use it down to the last fraction of an inch without touching the soap with your fingers. And the stick will stand steady and upright, wherever you set it down.

The familiar hinged-cover nickeled box

Three forms of the same good quality:

Williams' Shaving Stick Hinged-cover Nickeled Box

Williams' Holder Top Shaving Stick

Williams' Shaving Powder Hinged-cover Nickeled Box

A trial sample of either sent for 4 cents in stamps

Address The J. B. Williams Co., Dept. A, Glastonbury, Conn.

Makers of Williams' Famous Shaving Stick
Jersey Cream Toilet Soap, Dentalactic Tooth Powder, &c.

Note the convenient sanitary hinged-cover nickeled box

RAILROAD MAN'S MAGAZINE

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ISSUED MONTHLY BY THE FRANK A. MUNSEY COMPANY
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—Continued

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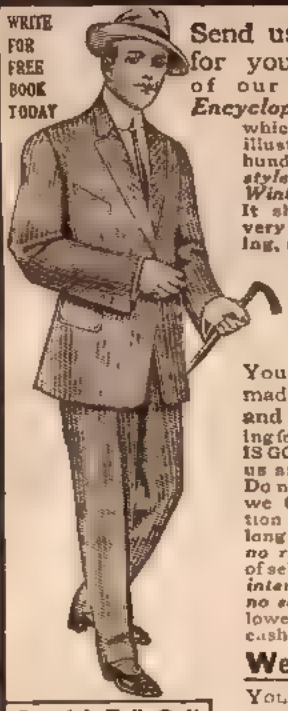

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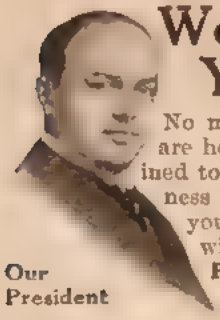

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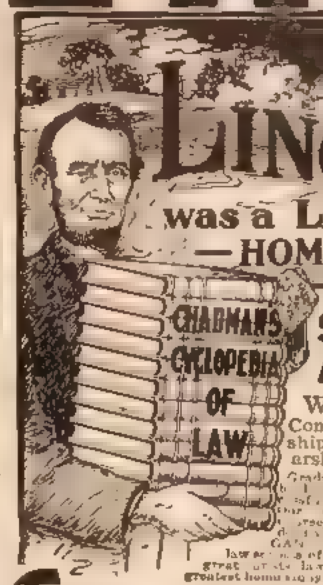

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RAILROAD MAN'S MAGAZINE

Vol. XIX. OCTOBER, 1912. No. 1.

DOWN THE WORLD'S STEEPEST GRADE.

BY FREDERICK A. TALBOT.
Author of "The Railway Conquest of the World."

NINETY-NINE persons out of a [illegible] that O'Brian, the [illegible] engineer, was Irish, and those ninety-nine would be wrong, notwithstanding the apparent Hibernian flavor of the patronymic and the unconventional method of spelling a well-known name.

But O'Brian certainly has the humor of those from the Emerald Isle, and one enjoys this to the utmost when he undertakes to turn raconteur.

O'Brian was the erecting engineer of the Leipzig Aerial Ropeway, Bleichert and Company, when they undertook to climb to the top of the inland plateau of German East Africa, to establish a line to bring down the vast wealth of cedar

WHERE THE GERMAN EAST AFRICA "RAILWAY" BEGINS A DROP OF 6,600 FEET IN FIVE AND ONE-HALF MILES.

growing in those latitudes, for the lead pencils and furniture manufacturers.

Germany, like other countries, is suffering from a dearth of this wood, and it has hit several of her industries hard. The colony on the eastern seaboard of the African continent was lying unforgotten almost, when somebody came back from the interior with stories of great cedar groves.

Timber cruisers went out for a prominent Berlin house, and the wanderer's statements were confirmed. Then the home house got busy. They would get that timber down to the coast

Drops 6,600 Feet in 5 1-2 Miles.

It was a case of being easier said than done. There was a matter of 6,600 feet difference in altitude between the groves and the shipping point below, and this difference in level had to be overcome in less than five and a half miles.

The worst jump was one of 5,000 feet from the Paganis plains to Usambara among the clouds, over rocky cliffs which seemed as if they had been trimmed with a giant's chisel and the chips left lying around.

The surveyors reconnoitered the country and returned with a doleful story. A surface line was quite out of the question unless the *concessionnaires* were prepared to spend more money than they would ever earn.

But a line through the air! Why, that would fill the situation perfectly!

Engineer O'Brian's house took up the matter. This firm had thrown a thin cable over one of the worst stretches of the Andes, had met the coal shipping situation in Spitzbergen, found a means of getting the ore down to the coast in New Caledonia, and had fixed up a transport system near Pekin, all via the air, so they saw no tangible reason why the same system should not be feasible in Africa.

Expense was a governing factor, but Bleichert and Company undertook that this desideratum would be studied to the utmost degree.

The surveyors had a lively time plotting that line. The first preliminary showed that they were going to be up against it all the way. The forest was as dense as tropical jungle only can be, and the surveyors were warned to keep a sharp lookout for lions and other denizens of the forest who roamed as thickly as black bears in the Rockies.

They hustled up a few natives to act as guides, chore boys, and assistants. Coils of rope were carried to let down the men with the transit to plot from difficult ledges and to hold them on footings where an eagle would have had a mighty stiff struggle to perch.

Survey after survey was run, but the sum of one and all showed that the enterprise would bristle with some ticklish problems; that there would have to be some terrifying gradients and stiff leaps through the air from crag to crag.

A single swing of 5,000 feet seemed inevitable, but when the location line was run the surveyors found that this leap could be split into three stages by seizing two ledges on the mountain to erect angle stations.

The work was commenced. It was found rough going through rugged primevalism, with thirty-feet lengths of steel slung on the shoulders of the coolies and carried for miles by a circuitous route, to where the towers were to be erected.

The blacks concluded that union, in this case, meant safety. They have a dread of man-eaters, born of terrible experience, so when they got warning that a lion was on the prowl they promptly dropped their loads and swarmed the nearest trees to wait until the danger had passed or had been scared away by a white man who did not miss the opportunity to indulge in a big-game hunting interlude.

When the Lions Came.

Then the coolies would come to earth again, displaying their ivory white teeth in broad grins of pleasure and gratitude to their white preservers, hoist up the chunk of metal, and walk on again with slowly measured steps.

The African native may be a poor engineer, but he is smart in detecting the presence of a lion, and, after a few scares, the Europeans came to the conclusion that they might copy black artfulness in the bush.

This was particularly the case when the teams of oxen were out pulling the

heavy loads. Each train would be accompanied by its black drivers, when suddenly all would be scared at the glimpse of a man-eater and the teams being left to their fate.

Losses from this cause became extrees around the working camps, and boxes were nailed to the branches house them. They were fed regula and plentifully, and the engineers had every cause to bless these vigilant sentinels

CEDAR-LOG TRAIN APPROACHING A SUPPORT AFTER MAKING THE 7,000-FOOT GRADE

cedingly awkward so the engineers went rummaging for tame [illegible] ing and bartering them from the negroes. The ape is the danger signal of the forest with a particular aversion for lions. Lions in Africa, unlike the [illegible], are exceedingly bold and do not hesitate to attack in broad daylight.

Our apes were chained to the tops of

The monkey is naturally very curious, and these tame brutes spent their time peering into the jungle on every side with sharp eyes

Directly the tan coat of a man-eater was spotted or his presence sniffed, the [illegible] gave vent to the most piercing shrieks, as if suffering untold torture But the graders did not worry. It was simply the signal for "down tools!"

AFTER THE STEEP GRADE HAS BEEN MADE THE CEDAR-LOG TRAIN SWEEPS THROUGH THE STATION AT EIGHTY MILES AN HOUR.

and shin the nearest tree as the king of beasts was prowling around in search of a meal.

The hostility of nature was emphasized in another manner. The engineers had selected a small ledge on a cone-shaped peak for an angle station. When the builders arrived there they found the rock soft and crumbly. It was somewhat difficult to blast away, as there were so many missed shots and blow-outs. But by persistence they cleared a highly satisfactory platform where the angle station could be erected.

Grade Is 80.9 Per Cent.

The foundations of the building were about to be commenced when the cone gave signs of shifting and several thousand tons of debris slipped onto the leveled ledge, the engineers getting clear in the nick of time.

With infinite labor the rubbish was cleared away, and then came another slip. This was similarly sent rattling down the mountain slopes and then a retaining wall was built so as to lean against the side of the peak. The space behind was filled with concrete rammed well home.

This kept the sliding mountain slopes within bounds and the angle station was completed.

The section between the first and second angle stations is particularly interesting, inasmuch as it is the steepest piece of transportation line in the world, the gradient being 80.9 per cent.

The swing through the air has been subdivided by means of an intermediate tower 100 feet in height, run upwards from a friendly notch in the rock, so that the line droops in two festoons, each about 990 feet in length.

When one is traveling over this line to the interior—and it is the only means whereby the plateau may be gained—one has to perform an acrobatic feat. Unless care is shown the friendly timber log on which one is sitting rears up and tips you head downward. The point is to see that you have your legs set that when the log strikes the grade you are almost in an upright position.

This sensation is varied by making a clean dive through the air in a single span exceeding 2,000 feet. If anything

ever goes wrong with the passenger carrying facilities in the center of this span the traveler will make a straight dive of 600 feet to the valley below.

The tropical rains gave the engineers endless anxiety. Six supports had been deemed as being necessary to support the line at one place, and a computation for the removal of 70,000 cubic feet of earth was considered ample.

The first downpour showed the engineers the error of their ways, because the whole lot was blotted out by a fall of earth. The builders thereupon decided to make a bigger excavation, and, before they had finished, 210,000 cubic feet, or three times as much as contemplated originally, were cleared away.

At different points stretchers are provided to keep the ropes taut. These tension stations consist of steel towers fitted with sheaves over which the ropes pass to be attached to a ponderous weight built up of concrete blocks placed in a steel cradle.

These weights being permitted to rise and fall within the tower serve to keep the ropes at an even tension. At the angle stations where a sharp deviation to one side has to be made, the load is pushed over from one traveling rope to the other by manual labor.

The cars handle logs up to 46 feet in length and 2,240 pounds in weight. They are strapped to two carriages connected by the traction rope fitted with the Bleichert "automat" coupling, whereby a tight grip on the rope may be calculated. When an increase in the grip power is desired, as on the steepest grade, there are detents right and left of the hanger pin, against which the hanger stay leans during the climb.

White Ants Destroyed Timber.

Directly the grade is overcome and an easier stretch of line is entered, the grip is automatically released a little to accommodate the appliance to the changed conditions. One great advantage of this arrangement is that the traction rope is preserved against wear and tear.

Cut timber is carried on flat bottom suspended carriers, which, by the way, are employed also for carrying passengers who have to display no little dexterity when riding up and down the 80 per cent grade.

The engineers had some lively time

AT THE EDGE OF THE PLATEAU, WHERE THE RAILWAY STARTS ON ITS EIGHTY-SIX PER CENT GRADE.

AN [illegible] CUT IN THE MOUNTAINSIDE OVER 6,000 FEET FROM THE BASE

in transporting the heavier parts of the [illegible]t and constructional material. Everything had to be wrought in metal or masonry, as the ravages of the white ants meant a short life wherever timber was used. This hit the h[illegible] Struggling over the rough broken country against heavy gradients with such weighty and bulky articles as cement, water and steel was slow, costly, and difficult.

The greatest difficulty in the direction was in connection with a locomotive required for the loading st[illegible] A clearing had to be made [illegible] jungle to permit its passage. It demanded the combined efforts of a hundred natives and a staff of Europeans seven months to get the engine from the junction between the aerial railway and the surface adhesion system to the top of the plateau. Several thousand dollars were expended on this bit of work alone.

How the Great Speed Is Checked.

Before the natives could advance with any requisitions, special trails had to be blazed so that the porters with their cumbersome loads on their shoulders could move with comparative rapidity.

Then the engineers had to scour the country for labor, bringing in negroes from distant points, for the reason that the Masai could not be persuaded or tempted to work.

Under these adverse conditions transport and labor expenses rose to an abnormal level, excelling the cost of the material several times over.

When everything was ready for the ropes, Engineer O'Brian turned to his staff early one morning and remarked: "I'll inspect the supports once more, today, and then we'll put on the ropes."

He started off on his donkey accompanied by two natives. They were jogging quietly along the Usambara plateau, the engineer with his eagle eye fixed on the cleavage through the trees down which the steel towers were spaced.

They had just passed the sixth support when his steed gave a startled neigh and a plunge, catching the rider unawares. The result was that Engineer O'Brian executed an unrehearsed somersault in the air and tobogganed face downward along the ground.

The negroes with a yell plunged into the bush with the donkey at their heels, while instruments and tools were scattered on the ground. Wondering at the

A DOUBLE CAR CARRYING TWO LOGS FORTY-SIX FEET LONG AND WEIGHING A TON

ause of the disturbance, and desiring to have a look round, Mr. O'Brian shinned up the sixth tower. He was just running his eyes over the trees when up popped the scared face of the attendant on Tower 7, followed by that of the second native on Tower 8.

The three clung to their perches for several hours enjoying an African sunbath if experiencing other discomforts, including attacks from mosquitoes, until they concluded that descent might be made advantageously and safely. What was the reason for the disturbance? The lookey had sniffed the trail of a lion which had passed several hours b fore.

As may be supposed, the descending loads coming down the steepest grade are liable to attain terrific speed, so the must be held in check. As the upward going is comparatively light, the drive is calculated on the maximum of the ending load and all the excess power developed by the descending weight is absorbed by a brake regulator.

A 50 horse-power electric motor is quite adequate to supply all the power required, while the braking effort is taken up by a sheave about six and a half feet in diameter, the brakes being able to neutralize about 100 horse-power.

The brake is hydraulically operated and absolutely automatic in its action there being a high level reservoir containing about fifty-five cubic feet of water above the loading station to keep the brake-box regularly supplied with water also a low-level concrete reservoir for water in the dry season, this being connected with the high level feed-tank by pumping.

Although the railway is designed essentially for handling lumber, any one penetrating the interior and willing to experience a weird and unusual sensation may straddle a log or mount one of the platforms and be whisked up or down.

It requires no little nerve to keep a level head on the heavy banks. Sliding down the 80 per cent grade astride a log when there is a dip in the sag of the rope makes one clutch tightly. It knocks the breath out of the tenderfoot; but as Mr. O'Brian says, "You soon get accustomed to parachuting and Blondin stunts."

When the vice-governor of the province decided to make a journey of inspection to the plateau, he traveled with his suite by the Usambara aerial line. The platform passenger car was placed at the disposal of the official, but the

gentlemen accompanying him had to make themselves as comfortable as they could astride a tree trunk.

Several ladies have made the trip. A friend of mine tried it, balancing himself around a cedar log. As he slipped down the 80 per cent grade he felt, as he expressed it, as if the soles of his feet were shooting through his head.

Although the line is only about five and a half miles in length, it took three years to build, and by the time the erecting engineer had reported "O. K." on the official tests, and was satisfied that the spider's thread would stand up to its work, over $375,000 had been spent.

Does it pay? Well that is a question for the owners, but the fact that it brought down 35,000 cubic feet of cedar within the first six months, tends to prove that it has solved the transportation of lumber over a most difficult and mountainous stretch of country. At all events it ranks as one of the most remarkable aerials railways ever built.

The length of the cedar log line is five and a half miles from the loading station on the Usambara plateau, at an altitude of 6,600 feet, to the junction with the trunk adhesion railroad at Mkumbara station on the Pagams plains.

The drive and brake regulators is located at the upper terminal. The character of the work demanded a special drive and controller.

If only a few loads on the way to the valley happen to be on the rising section, and other loads are on the descending line, a very considerable capacity must be absorbed by braking. During the trial runs actual differences in capacity of plus and minus twenty five horse-power were registered. To maintain control over the line an electric motor of fifty horse power was installed capable of developing a high number of revolutions, and working by means of belting on the driving-shaft of the ropeway.

Apart from the conical driving-wheel a timber-lined band and a sheave of some seventy eight inches diameter are fixed on this shaft. When stopping the line, these brakes—able to neutralize one hundred horse-power—are tightened, although during work they are disengaged, as the regulation of the traveling speed is effected by the brake-regulator independently of human care and attention.

The regulator is hydraulic. It is driven by a belt from the countershaft and consists chiefly of a rotary pump and a balanced throttle slide. The former sucks the water from a reservoir in the foundation-box of the apparatus, and forces it through the passages of the governing valve into the box.

The valve is actuated by a centrifugal belt-driven regulator. So soon as the revolutions of the countershaft commence to increase, owing to reduced strain on the line, the throttle-slide closes correspondingly and checks the motion of the pump, the pump then acting on the shaft as a strong brake. The brake-box is kept regularly supplied with water from an elevated reservoir of fifty five cubic feet capacity.

The track rises gradually about 295 feet from the loading station at Usambara in a distance of 1,320 yards to gain the summit level—5,220 feet above sea level, and about 4,095 feeet above the lower station.

OLD CASS BROWN AND THE 283 RETIRE.

BORN July, 1871; died, June, 1912, the pride of the Big Four Railroad, at one time the biggest and fastest engine owned by the company, is the story of "Old 283." The engine was built by the Baldwin Locomotive Works, has carried the same boiler over almost a million miles of track, and up until the time of its withdrawal from service could do its share of wage earning. The engine made 143,230 miles since its last shopping. It was known as the C-X class and was one of the few sixteen by twenty-four inch cylinders on the Big Four system.

No one regrets seeing the engine pass into the graveyard as much as Engineer Cass Brown, seventy years old, retired, who drove the engine over the last 143,230 miles of track. Mr. Brown was well pleased when he learned that the engine was to retire about the same time he went on the pension roll and in tears he said: "We both have been mighty good wagons, but we broke down."

WHY THERE'S AN I. C. C.

The Seven-Headed Tribunal that Rules the Railroads, and the Reason for Its Existence.

BY JOHN MOODY.

"FOR years," writes one of the readers of the REVIEW OF REVIEWS MAGAZINE, "I have read a great many articles about the work of the Interstate Commerce Commission, but I have never found out just what was the particular function of this commission. Why was it created? What

CHARLES A. PROUTY, OF VERMONT. STARTED IN LIFE AS AN ASTRONOMER, STUDIED LAW, ENTERED POLITICS, BECAME A RAILROAD LAWYER AND AN EXPERT IN FIXING RATES.

Photograph by Harris & Ewing, Washington

does it stand for? What are its relations to the railroads? Why is it necessary? If you will answer these questions plainly and simply, more than one person in this country will thank you."

Well, to give the briefest possible definition, the Interstate Commerce Commission is the Supreme Court of the railroads; or, to be still more simple, it is the umpire of the big railroad ball-game

Interstate commerce — that is, commerce between States—found itself in a tangled-up mess, and it was necessary to have one body of men acting as a court to keep things running smoothly

The Interstate Commerce Commission was appointed for this purpose. Since it has been in existence it has been loudly praised and severely chastised by both public and railroads. It has proved itself both popular and unpopular, but being the highest tribunal for the settlement of all disputes between the railroads and the people, it ranks in importance next to the Supreme Court of the United States.

JUDSON C. CLEMENT OF GEORGIA, A SOUTHERN LAWYER AND CONGRESSMAN WHO VOTED FOR THE ACT TO CREATE THE COMMISSION.

Photograph by Harris & Ewing, Washington.

Commerce is the life-blood of a nation, and any interference with its circulation means industrial apathy. To maintain a steady circulation so that all parts of this country may continue in mercantile health, is part of the work of the Interstate Commerce Commission.

The demand for Federal regulation of interstate commerce is almost as old as the country itself. When the War of Independence ended, the Separist tendencies and local jealousies that existed in the case of the majority of the States, led to the passage of many vexatious State laws, framed for the purpose of hindering, if not blocking, the commercial progress of rival States.

Finally, the situation became so unbearable that, in 1785, the Annapolis Convention was called by the Virginia Legislature for the purpose of "considering the trade of the United States and to devise a uniform regulation of transportation rates that should conserve their common interests and permanent benefit."

Ten years before, Chief Justice Marshall, of the Federal Supreme Court, after bewailing the setback to trade that resulted from petty State jealousy, averred that there was "a deep and general conviction that commerce between the States ought to be regulated by Congress."

From that time right up to 1887, in which year Congress took positive action on the subject, lawyers have been trying to solve the knotty problems involved in the commercial relations of State with State on an equitable basis.

The term "interstate commerce" is a

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JAMES S. HARLAN LINCOLN, SON OF JUSTICE HARLAN OF THE UNITED STATES SUPREME COURT AND FORMER ATTORNEY-GENERAL OF PORTO RICO

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modern phrase. It was first used in an official sense in connection with an act passed in 1887. Yet the Constitution of 1787 speaks of "commerce among that States" as meaning "commerce that concerns more States than one."

More recently the courts have interpreted the word "commerce" to denote not merely a mutual selling and buying of traffic, but as a term of the largest import that includes trade in all its forms —not only navigation, transportation, and communication, but, also, the instruments and agents employed, such as express companies and telegraphic messages.

In extreme cases, commerce is even made to include lottery tickets. Any man, matter, or act that prevents the free and unrestricted flow of commerce between individuals, business organizations, corporations, or States, is now subject to the scrutiny and punitive powers of the Interstate Commerce Commission, which is expected to keep commercial channels clear, and punish those who try to clog them.

The first enactment of the Interstate Commerce Act took place in February, 1887. It was the crystallization of nearly a century of agitation and discussion. The act applied to common carriers. Freight carried wholly by railroads and partly by railroads and water was the basis of this enactment. It forbade unjust discrimination and undue and unreasonable rate preferences; made it unlawful to charge more for a shorter than for a longer haul over the same line going in the same direction, the shorter being included in the longer, although a carrier could be freed from this provision under certain conditions. It would not permit a pooling or division of earnings.

During the eighteen years that followed the passage of the act, it has done some good, but not as much as was expected. Discrimination against smaller shippers and some lines of commerce continued, so did secret rebating

The anti-pooling clause prevented open, but not secret, agreements between carriers. The long and short haul provision was the cause of untold judicial wrangling, and was made the basis of a variety of court interpretations.

To a very great extent, the effectiveness of the commissioners was destroyed by judicial decisions antagonistic to its rulings and, at the same time, it had no power to fix rates for the future.

These unsatisfactory conditions continued until in 1904, when President Roosevelt, in his message to Congress, made the amendments of the Interstate Commerce Act the chief issue at the sessions of 1905-1906.

His suggestions were fought tooth and nail by the representatives of the carriers. After the most remarkable series of Senatorial debates heard in Washing-

ton for many years, a number of amendments became law in July, 1906.

The act was strengthened in many ways, the number of commissioners was increased from five to seven. The salary of a commissioner was increased to $10,000 a year.

Facilities were provided for taking evidence. A clause was introduced compelling carriers to change rates within thirty days after a ruling by the commission.

Furthermore, the commission was empowered to establish joint rates and to order switches to be built. Pipe lines, express and sleeping-car companies, and all freight service and facilities were placed under its jurisdiction. It was authorized to examine the books of railroad companies at all times, and to make the contents of those books public. It was empowered to establish reasonable maximum rates to take effect within thirty days and to continue for two years, unless set aside by the courts in the interval.

The Sherman Anti-Trust Law of 1890 had already given to the commission powers that were not within the province of the body of 1887, while the Hepburn Act, of 1906, still further increased its right to fix freight rates. Other acts were passed strengthening the hands of the commission. To-day it is a tower of strength, vested with the authority to inquire into and order changes in all railroad conditions.

One of the factors that contributes to the power of the commission is its elasticity. In common with certain special tribunals of the British Empire, it has been shown that when such tribunals have the authority to determine prices and rates—provided that they are not subject to frequent changes of membership—they tend to evolve from their experiences a set of principles that are in harmony with existing economic relations and tendencies that are certain to change with the times.

In its present form, the commission fills a place in the commercial economy of the nation, the value of which can hardly be computed. The fact that a number of its decisions have been overruled by the courts is not proof that it lacks efficiency or knowledge of the commercial needs of the public.

The truth seems to be that its decisions appear to be the outcome of what it holds are "social and economic considerations," rather than a strict compliance with the technicalities of the law. In other words, it would seem that it puts the rights of the public a little in advance of the hair-splitting of the courts.

The procedure of the commission is simple. If an individual or a corporation deems that a carrier or a business rival is, or is attempting, to violate any part of the Interstate Commerce Act, a formal complaint is made to the commission. After an investigation to learn if

FRANKLIN K. LANE, OF CALIFORNIA. FORMERLY A NEWSPAPER REPORTER, THEN A LAWYER, AND ONCE CANDIDATE FOR GOVERNOR OF HIS STATE.

Photograph by Harris & Ewing, Washington

[illegible] is warranted, it cites the accused to appear. The proceedings assume the methods of a civil suit at a bar of justice.

Nine-tenths of the cases deal with transportation, and the brain-paralyzing questions that arise are simply staggering. A Chinese puzzle is like reading the first lesson in a reader in comparison.

The commission bases its rate-making on "value of services," instead of "cost of service"—rightfully, so it would seem, concluding that "value of service" may be defined as the "ability afforded the shipper to reach a market and make his commodity an article of commerce."

In a more definite sense, it means reaching a market so as to make a profit.

These statements seem to imply that "value of service" is measured by the difference in the market value of the commodity at the point of shipment and the place of unloading; but theory and experience have taught the commission that this difference is determined by the railroad rate. Hence the persistent watch that it keeps on such rates.

EDGAR E. CLARK, OF IOWA. ONCE A BRAKEMAN IN THE OLD MILWAUKEE AND ST. PAUL RAILROAD. HE IS THE ONLY RAILROAD MAN ON THE COMMISSION.

Photograph by Harris & Ewing, Washington.

The hundreds of curious problems which the commission is asked to solve may best be illustrated by an example

A complaint was instituted by the Chicago Board of Trade, the defendants being a number of railroads in the Mid-

without conflict that the live hog and its products are in direct competition with each other, the products being much more valuable and transported at more expense to the carriers."

Therefore, the railroads were officially

CHARLES I. McCHORD, OF KENTUCKY — AUTHOR OF THE McCHORD RAILWAY RATE BILL ADOPTED BY THE LEGISLATURE OF HIS STATE — PRESIDENT OF THE NATIONAL ASSOCIATION OF RAILWAY COMMISSIONS.

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dle West charged with giving lower rates on packing-house products from Sioux City, Iowa, and other Western packing centers to Chicago, than they gave to live hogs when shipped to that city.

The carriers defended their practises on a number of grounds, none of which were held by the commission to warrant the discrimination. It decided that "as articles of commerce, the evidence shows

notified that "the rates charged for live hogs should not be greater than the rates charged for packing-house products."

The following will show the complexity of some of the cases:

The Shippers' Association of northwest Iowa complained that the Illinois Central Railroad Company, *et al*, charged excessive rates on corn, wheat, and other grain from Sioux City and other points

to Chicago and points on the east bank of the Mississippi River.

A certain firm asked that the Lehigh Valley Railroad be compelled to give the same classifications and rates to anthracite coal as were given to bituminous.

A Standard Oil subsidiary company asked that the Western New York and Pennsylvania Railroad be ordered to charge only on the basis of the weight of the oil carried in barrels what it charged for oil only if carried in tanks, and not to charge barrel shipments on the gross weight.

To prevent railroad ties being classified as manufactured wooden commodities while a specially low rate was charged for lumber, was another puzzle.

Sometimes the commission has to fall back on mathematics for a solution. In a recent case in which the relative rates for cabbages and potatoes was the point at issue, the commission stated:

> As the weight of a barrel of cabbages [illegible] fourths that of a barrel of potatoes, and as its price in value is only [illegible] (two-fourths) of that of the potatoes, it would seem that there is a difference of one-fourth in favor of the cabbages. Our conclusion, therefore, is that the rate on cabbage from Charleston to points north should be one-fourth less than the rate on potatoes.

Occasionally the current value of a commodity is accepted as a standard for rates. For example, in discussing the rate on hay, the commission stated:

> When the market price of a commodity yields but a scant return for labor and expense of production, the cost of transportation needs to be as moderate as may be consistent with justice to the carrier.

The commission has upheld the practise of certain railroads of putting immigrants into a special class and giving them lower rates than were accorded to first or second-class passengers and the refusal of the roads to sell tickets to other persons at the same rates as were given to immigrants, even though these persons were willing to ride in the immigrant cars.

The present commission consists of Charles A. Prouty, of Vermont; Judson C. Clements, of Georgia; Franklin K. Lane, of California; Edgar E. Clark, of Iowa; James S. Harlan, of Illinois; Charles C. McChord, of Kentucky, and Balthasar H. Meyer, of Wisconsin.

A staff of agents is employed to secure information for the members. This staff is very necessary to the seven men who must decide some of the most knotty brain-teasers in the world of law.

SLAUGHTER OF THE BUFFALO.

After the completion of the Santa Fe, the slaughter of the buffalo became a most profitable industry, and the annihilation of the king of the plains was shameful. Many can doubtless recall a small lake where Syracuse now stands, known in those days as the buffalo watering place. This locality proved to be the harvest ground for the cruel killer, and we are not exaggerating in stating that the pedestrian could travel five or six miles without placing his foot on mother earth, but, instead, treading the distance on the bones of the slaughtered bison.

The hunters usually worked in threes, as they could do greater execution, and the first hour's work in the morning would be devoted to killing. Usually from thirty to forty would be their harvest, and this would be a sufficient number for the day's work. The average hunter would be disappointed if his day's labor did not bring him in from ten to twelve dollars.

The principal value of the buffalo lay in his hide. For that of a bull, the captor received an average of two dollars, and for a cow's hide one dollar. Horns sold for five cents a pair, and the hair was a small item. Later the bones were purchased by Eastern fertilizing companies. But think of the millions of pounds of juicy buffalo steaks and roasts that went to waste, and how they would be relished and appreciated in these days!

The buffalo has disappeared, and the cruel hunter, we hope, has been forced to seek a more humane calling for a livelihood. Almost forty years have elapsed, and time, therefore, has wrought many changes. The wild and desolate plains of Kansas and eastern Colorado are now a land of great fertility, abounding in wealth and prosperity. Therefore civilization has been richly rewarded for the courageous efforts of the pioneer railroad builders of Kansas in the early seventies.—V. V. Ritter, in *Santa Fe Employees' Magazine*.

[There are, to-day, scarcely fourteen hundred buffaloes in all North America.—THE EDITOR.]

Drift, of the White Crow.

BY JARED L. FULLER.

Author of "Block Tower Seven," "The Phantom Train," "The Jumping-Off Place," "The Flight of the Bald Eagle," Etc.

Old Man Trouble Gets on the Right-of-Way of the Big Boulder Division of the N. and P. System.

CHAPTER I.

Tom Drift Is Discharged.

"LAID off again, are ye, Tom?"

"Of course. There's nothing for me to do in the yard, Anse, and it's me to the woods till somebody's laid up. It would have been money in my pocket if I'd cut the road altogether six months ago, when the new super came on."

"Sh-h! your gallopin'-rods have got too much slam, boy. There's them that carry tales."

"Let 'em carry! I might as well get off right here and now."

"I dunno," observed Anson Prendergast, the old yardmaster, tipping his chair back against the dingy clapboards which sheathed the sunny wall of his office. "I hate to see a feller lose his grip when once he's got it! Bulldog grit tells in the end, Tom."

"Bah! A snapping-turtle's got bulldog grit; dangle a bit of meat on the end of a string and let the turtle once snap it up, and he'll *never* let go. All the fool turtle makes out of his hanging on is an introduction to the cook."

"And you're getting cooked pretty brown, I do admit!" exclaimed Anse through his nose, his eyes twinkling. "Serrill's sartainly got it in for you. If you stopped calling at a certain house on the hill—"

"That's a matter we won't discuss, Anse," interposed Tom Drift quickly.

The engineer possessed a thatch of curly hair of a hue that signaled no meek spirit; it was red.

"Jest a little in the snapping-turtle line yourself this afternoon, hey?" said the boss. "Well, dunno's I blame ye for feeling wrathy. After the years you've spent in making yourself a bang-up eagle-eye—"

"Mr. Larrabee, the old super, said I was the best on the division; I say it without boasting," said Drift doggedly. "And I ought to be. Why, you know yourself, Anse, that my father used to let me ride behind him when I scarce come up to your knee.

"He was one of the best among the old-timers. I learned a lot from him. And when he lost his life on this very Big Boulder division—it was an independent road them—I was expected to step into his shoes.

"I reckon the old B. B. *was* as crooked as a ram's horn and our schedules were mighty slow. Being absorbed by the N. and P. has been a good thing in some ways, but these new officials don't treat us like the old."

"That's allus the way," admitted Anse philosophically. "The Big Boulder's tracks have been straightened, and that makes possible the White Crow—the very run you ought to have now, Tom."

"And the very run the super declares I don't know enough to hold," growled Drift. "I held it all right before he came on."

"And you'll hold it again if Serrill

goes off," whispered Anse. He wagged his bald head knowingly. "He ain't liked by everybody, this new super. Now, if he was like Mr. Ballington—"

"I grant you Ballington Serrill seems to be a square sort of chap," said the disgruntled engineer. "But he's only his uncle's assistant. I know he did not approve of giving Parsons my run and my engine."

"I'd hold on, Tom, jest th' same."

The old man's speech halted. His jaws came together with a snap. His sudden silence held Drift's puzzled attention.

The telegraph instrument inside the little office was rattling frantically, and Drift saw that the boss was reading the message as it came from the wire. It was plain, from the expression on Prendergast's face, that it was a message of moment.

The breadth of the busy yard of the Logan City terminal lay before them. Chains of box cars, flats, dumps, and cattle-cars littered the various tracks.

A fussy little switch-engine was kicking cars about in a most unmannerly way, driving them here, there, and everywhere, and coughing derisively as the cars scurried over the switches and bumped, with clatter and shriek, into each other.

An excursion train had just come in from the west and still lay at the station, which was visible from the yard-office.

A mogul—a freight-hauler—had been relieved a few minutes before and was waiting an opportunity to be shifted across the yard to the roundhouse, where its fires might be drawn; but the turntable was occupied at the moment by No. 210, a big, new passenger-hauler, prepared to take the White Crow Flier on into the east as soon as she should be brought in from Big Boulder.

It was down grade into the yard from the west, and a thread of smoke above the wooded mountainside and the faint whistle of the flier, had already warned the yard of her approach.

The east-bound track was cleared, save for the excursion train then at the station platform. The red board was hung out against any inbound train on that track; but the excursion train was to pull out and a clear track given the White Crow when she was due.

It had been upon the tip of Tom Drift's tongue, when he first saw the flutter of smoke above the tree tops, to say that the flier was ahead of schedule. But old Anse knocked the idea out of the engineer's head.

"What's the matter?" demanded Drift, as the yardmaster got to his feet.

The sounder was still rattling. There came the sharper, nearer shriek of the White Crow's whistle.

Gid Larrabee, long-legged and freckled, bounded out of the office waving a bit of flimsy and so excited that he could only stutter.

"Never mind that!" cried Anse. "Run and have the whistle blown for the wrecking crew."

"What is it?" demanded Drift again, seizing the old man's arm.

"Just what I warned Serrill would happen if he didn't have the repair gang look more carefully after their work. To my knowledge that air-brake has been reported five times—"

"On 67?"

"Yep. It's give out again. They wired from Julep. Hear her comin' down the grade, yellin' like a banshee for the hand-brakes? And them shacks can't hold such a heavy train."

"She'll run into this block."

"By thunder, Tom! she'll run into wuss that *that*," gasped the old man.

Drift wheeled and looked down the yard.

"The excursion!" he whispered. "They can't pull her out in time."

"We'll throw the express onto that siding," exclaimed Prendergast, and started across the yard full pelt.

But the young engineer, whose brain and legs were more active, overtook the yard boss and caught him by the arm.

"That string of cars is loaded. You'll do a power of damage, and perhaps derail the express," Drift shouted in Prendergast's ear. "Listen to me! Switch the mogul onto the east track—I'll meet the flier with her as she comes down. It'll make mince meat of the freight-hauler, but it will stop the White Crow, perhaps without serious damage."

"It'll make mince meat of *you*, you young fool!" roared Prendergast.

But Drift was already across the intervening tracks and had leaped upon the mogul. Her crew had left her

steaming there unattended while waiting for a chance to get her into the roundhouse—in itself an infraction of the road's rules which they would later have to explain.

Foolish as he believed Drift's act to be, Prendergast obeyed the engineer's command. He flung over the switch and the mogul, starting slowly, slid onto the main track.

The shrieking flier at that moment dashed into view. She had gathered the momentum of twenty miles of down grade before her air gave out and, as Prendergast had prophesied, the hand-brakes retarded her speed but slightly.

At the station the train starter had been warned from the despatcher's office; but the heavy passenger train could not be moved in time to escape a terrible rear-end collision.

Everybody saw the situation in the same way—saving one man. It was Kismet with all but Tom Drift.

He alone believed there was a chance to save both trains. He opened wide the throttle of the mogul, and on her last few pounds of steam the huge freight hauler rolled up the yard to meet the approaching runaway.

Big as No. 67 was, the mogul was heavier by many tons. She would be no slight buffer for the on-rushing train.

Yet, when the flier struck the sacrificed locomotive, it seemed as if the wreck must be strewn all over the Logan City yard!

Prendergast, his bald head shining in the sun, his shirt-sleeves fluttering, tried to overtake the mogul, yelling as he ran:

"Jump, Tom! Jump, you fool! It's sure death you're courting!"

And Tom Drift knew that quite as well as the old roundhouse boss. The tender of the freight engine would receive the full weight of the flier's charge and must crumple up like cardboard.

Drift had method in his apparent madness, however. He measured the rapidly decreasing distance between the on-rushing flier and his engine, with clear vision; his nerves were unshaken as the monster bore so swiftly down upon him.

He knew that behind him the track was clear to the station—and the excursion train, only now clumsily getting under way. Prendergast had shut the switch after the mogul crossed over.

Sixty-seven came plunging down the hill with her long string of Pullmans and vestibule coaches behind her. The expected smash would be a terrific one!

Suddenly Drift reversed the freight engine and, with the grade in her favor she began to slide back into the yard again. With a hand that never trembled Drift regulated her speed so that, within a few yards, he worked the mogul up to a pace but little under that of the runaway.

Fire was spurting from the brake-shoes on either side of the heavy train as it thundered down into the yard; but to halt it before the station was reached was beyond the powers of the engineer of Number 67, or of the crew.

Nearer and nearer she came. Drift, knowing the track ahead to be clear, seldom glanced in that direction. His gaze was fixed upon the monster hurtling down upon him.

Suddenly the pilot of the flier bunted the mogul's tender. The shock was terrific, and Drift was almost thrown out of the window; but he clung like a leech to the seat and instantly threw over the bar again. With all her weight, the freight hauler bucked back against the runaway.

Fortunately neither engine was derailed; but for some hundreds of yards the mogul was pushed on by the weight of the flier, the latter not being retarded in the least.

It was like two bulls with locked horns, the heavier pushing the other about the paddock.

The tender of the freight engine rose in the air, its fore truck leaving the rails entirely, breaking the coupling and thrusting the drawhead of the tender into the cab

Bits of splintering metal flew about Drift; but he stuck to his post -indeed, he could not jump, for the front of the tender had crowded into the cab.

In a cloud of escaping steam, and deafened by the shrieking brakes and grinding ironwork, the flier pushed the obstructing locomotive down the yard.

Had the engineer of the train stuck to his bench with the pluck that signaled Tom Drift's act, the stopping of the flier might have been accomplished sooner.

But he jumped, and his fireman, in following his example, went to the hospital.

The excursion train was now under way—and not a moment too soon. The runaway came to a grinding halt, the half-wrecked freight hauler before it, just where the rear of the excursion train had stood.

Tom Drift climbed through the broken window of the wrecked mogul as a number of excited officials arrived from the offices.

Foremost was James E. Serrill, the division superintendent. He was a man tolerant of neither mistakes nor accidents; and when he recognized the young engineer crawling from the wreck of the mogul, his passion blazed forth.

"Is that your engine, Drift?" he demanded.

Drift explained -or tried to, but Serrill interrupted.

"I saw you! I saw you run that engine in the way of the flier. You caused this wreck deliberately, you scoundrel. Do you realize that mogul is worth twenty thousand dollars?"

"It was the only way I saw of halting the flier, Mr. Serrill," said Drift quietly.

"Don't talk to me!" ejaculated the angry superintendent. "It was done with intention to injure the division. I know your reason, and I'll give you a greater reason for wishing to injure me and the Big Boulder branch.

"You're discharged, Drift! You can go up to Ballington and get your time. The Big Boulder can get along without you in the future, and if *I* have any influence with the Northwestern and Pacific system, you'll never sit in a locomotive cab again!"

Drift's wrath had been steadily rising. He advanced now on the superintendent with clenched hands.

"You've got a right to discharge me, Mr. Serrill—for any cause, or no cause at all; I grant you that. But if you try to blacklist me, I'll see what the Brotherhood has to say about it. You're going a step too far—"

Anse Prendergast seized his arm and dragged him aside. All the idlers and roundhouse men were pouring across the tracks, and the blowing of the roundhouse whistle by Gid Larrabee would quickly bring the wrecking crew.

Parsons, engineer of the flier, who had jumped, came limping up, and Serrill turned on him. So the roundhouse boss led the wrathful Drift away.

"Don't make it worse by kicking," he advised. "Let the old man dress Parsons down a bit—it will relieve him."

"And, by thunder! Parsons deserves it. Think of an eagle-eye in as responsible position as he was, jumping—and when the danger was practically past!"

"I allus reckoned there was a chunk of yaller in Jim Parsons as big as one o' these yere grape-fruit. He's allus been huntin' soft-snaps since he struck this division — something showy and easy. He reckoned the White Crow was his meat."

Drift was gloomily silent, but Prendergast went on cheerfully:

"I recollect such fellers as him in the army. They couldn't stand the marchin' in the infantry, an' so they got exchanged into the cavalry; and they couldn't stand the joltin' in the cavalry, and so they exchanged from that to the artillery; and there they couldn't stand the noise, and either got a red-tape snap at Washington, or exchanged over into Canada and peddled fancy soap till the war was over. I reckon Parsons will peddle soap for a while," and the old man chuckled.

"Well, he isn't any worse off than I am," growled Tom Drift. "He's got the sack for losing his air on a defective brake—which was the fault of somebody else. And I got the sack for saving the train from a bad smash-up. There doesn't seem to be much justice in either decision."

CHAPTER II.

Fate Takes a Hand.

A FLAT on which was guyed a big derrick was run alongside the tangle of scrap iron that once had been a freight engine, and in half an hour the track was cleared.

Tom Drift had watched the proceedings from the doorway of Prendergast's shack, and now he turned to shake the old man's hand before leaving the yard.

"Well, it's settled for me at last, Anse," he said sadly. "Milly and I will have to give up our little home and cast about for a new one. Serrill will queer

me all 'over the N. and P.—that's sure. We'd better go East."

"Don't you jump too quick, Tom," advised the boss. "Hey! there's the old man crossing the yard now. Try him again."

"What? Ask him to reinstate me after what he just said? If he opened up on me again I'd knock him down!"

"Tom," said the old man earnestly, "you ain't a very pacific cuss. If you ever want to keep a job under a man like Jim Serrill, you want to be circumspect. Ye don't palaver enough, Tom—ter keep yer job."

"I couldn't keep it if I did," returned Drift, smiling grimly at the foreman's story. "And it's not in me to get down and lick the boots of any man, Anse."

He squared his shoulders and turned from the weather-beaten office of the yardmaster, taking the cinder-path to the station.

Ballington Serrill, the assistant superintendent, was not the counterpart of his uncle—in looks, at least. But Drift did not know him well. Both the Serrills were comparatively newcomers to the Big Boulder division.

Ballington was college bred and, in the eyes of men like Tom Drift, who was a thoroughly practical railroad man, seemed rather callow. But the directors of the N. and P. had the same degree of confidence in the younger Serrill that they had in James E.

It was Ballington's way to be friendly with the employees of the division, and even in the short time he had been among them he had learned a good deal about the Big Boulder men as individuals.

"How's this, Drift?" he asked, when the engineer asked for a bill of his time to take to the cashier. "Are you leaving us?"

"I can't live on half rations, and should make a change anyway," said Tom Drift sharply. "But Mr. Serrill has saved me that trouble. I'm discharged."

Ballington had heard rumors of the row over the wrecked mogul. He tapped the edge of his desk with his pencil thoughtfully.

"Will you wait until I have a chance to speak with the superintendent, Drift?" he asked.

But Drift had no use for either Serrill now—he was sore at heart, and plainly showed it.

"I'm through!" he growled. "Just give me my time. I've served the Big Boulder—in the shops and on the iron—for ten years; but there's other roads, I reckon, that will pay as good wages."

Ballington's lips were closed. He let the young engineer go and soon Drift was out on the street with his pay-envelope in his pocket and a sore heart.

For Tom Drift had been "born and brought up" on the division, and the wrench of parting from the road and his old associates would be a hard one.

He had sat behind his father in the cab of one of the first locomotives ever driven through the Big Boulder Basin and—later, when the N. and P. had absorbed the independent road—had helped build the straighter line up the stiff grade of the circular mountain wall and over the Pioco Saddle.

He had served three years in the shops—from the age of sixteen to nineteen—and was a good mechanic as well as an A1 engineer. When the road was straightened and the White Crow put on the schedule, it was understood, young as he was, that Tom Drift and No. 67 were to pull the flier from Big Boulder to Logan City.

The change in the right-of-way was as straight as a crow's flight over the Saddle and through the valley known as Big Boulder Basin. From the wooded heights behind Logan City, the fast express looked like a white streak flashing through the valley.

Therefore, the nickname, "White Crow," which had become attached to train No. 42 over the Big Boulder division of the Northwestern and Pacific Railroad.

When James E. Serrill came into command at Logan City, however, Tom Drift soon found Old Man Trouble camping on his trail.

With slight excuse the new superintendent had shifted Drift from the 67 and given him an inferior engine and an inferior run. In six months the best eagle-eye on the division had been relegated to a position little better than that of a "sub."

The bitterness of all this welled up in Tom Drift's soul as he left the railway offices behind him.

Up on the mountainside, close to Hallett Crossing, stood two cottages, side by side. One, Drift's father had built, and the young engineer and his sister Milly, occupied it now.

The cottage long ago had been the home of the Longstreets. But since those early days Mr. Longstreet had made a mint of money out of a mine, had moved down into the city proper, had built a handsome home for his family and, dying, left his wife and daughter wealthy.

But Sara Longstreet and Tom Drift had remained the best of friends through all these changes. Tom had never "presumed," for he well knew Mrs. Longstreet's ambitions for her daughter.

But Sara, herself, after she had returned from boarding-school, where she was sent to be "finished," had shown plainly that she considered the Drifts, Milly and Tom, quite good enough to be her friends still.

The superintendent of the division was looked upon favorably by Mrs. Longstreet as a suitor for Sara, notwithstanding the disparity in the ages of the girl and Serrill.

Serrill had been very attentive to the young woman until she had asked Tom Drift a few questions pointblank about the super. Then Sara, disregarding her mother's wishes, had turned her back upon him.

Result: Tom Drift found himself out of a job.

He paced the street which bounded the railroad yard and shops, gloomily enough, scarcely seeing the men he met and to whom he nodded. The shops were closing for the day and many of his old associates hailed him, for Drift was popular.

Suddenly at a corner of the street his attention was turned to a crowd of laughing and hooting boys. He glanced to the roadway and, with a startled and pained expression, recognized the object of their raillery.

A stalwart man—a man of almost gigantic physique—marched down the roadway paying slight attention to those who jeered him. He swung his powerful arms like flails; his gray beard swept the breast of his coat; his eyes burned with an insane light.

"Hi—yi! it's old Jake Monteith," shouted one boy to another. "He's as crazy as a loon."

"Hush hush!" exclaimed Drift, putting the youth aside with one hand and pushing before him into the crowd. "He's been one of the best engineers the road ever had. And working for the Big Boulder is what made him as he is—don't you know that? Don't anger him, boys."

But the big man paid no more attention to the throng about him than his own old locomotive would have paid to the buzzing of so many flies. He still swung his arms as he marched solemnly on, and now he cried in a sonorous voice:

"I am from heaven! And, once blind, I now can see as I did in the bright days of my youth. Let me spread the glad tidings!"

Attracted by the crowd, two policemen came up and seized the old man. Everybody in Logan City knew him. He had been one of the early locomotive engineers—like Drift's father—when Big Boulder was in its infancy.

Peering out of his cab window, year after year, had finally injured Jake Monteith's sight, and—well, there was no pension in his day for the man who so frequently stands between the traveling public and peril.

He had been turned off by Serrill with no more warning than would have been given the last wiper taken on at the roundhouse. Monteith's invalid wife had recently died and he had saved a little money.

Loss of work and failing sight had turned the old man's brain—and, perhaps, some additional trouble had much to do with his present condition. It was well known that James E. Serrill had other occasion for disliking old Jake Monteith, and that Monteith had not lost his job entirely because of defective vision.

The policemen knew the old man; but at times he was dangerous and they dared take no risks. Having no handcuffs with them, they borrowed a rope and bound the insane man's arms to his sides.

He did not struggle until they had him tightly triced and endeavored to urge him toward the police station. He looked at them with a calm and confident smile.

"See!" he cried aloud. "Ropes will not hold me. Behold—a miracle!" and putting forth the enormous strength engendered by his condition, he actually snapped his bonds.

The crowd fell back with exclamations of wonder and fear.

The madman bounded to the other side of the road, but stopped suddenly in his flight.

Coming down the street and walking briskly, swinging his heavy cane, appeared James E. Serrill.

The madman halted him with upraised arms, and a torrent of curses poured from his lips. His face blazed with passion, his lips were foam-flecked in this spasm of demoniacal rage.

There was not a doubt of the superintendent's peril. He sprang away to escape the madman's attack, and Monteith followed him.

The policemen, having been joined by two more, hurried to secure their prisoner; but as Monteith flung himself at Serrill's throat, Serrill side-stepped and brought the heavy knob of the cane on the madman's crown!

The blow felled the old man, the blood running in a stream upon the pavement and the police held and tied him again.

Some of the bystanders gathered about the super to congratulate him on his escape; but Serrill quickly got away from them. He passed Tom Drift without a glance; the engineer saw that the railroad official was greatly moved by his encounter with the madman.

At the first corner, Drift being right on his heels, the superintendent of the Big Boulder division was again halted on the walk. A woman, with a shawl over her head which half shrouded her features, stood in his path.

"Where is he?" Drift heard her cry. "If any harm comes to my father I know it will be through you, Jim Serrill! Have you seen him?"

Drift halted, too. He recognized Maria Monteith, old Jacob's daughter. The engineer shrank from telling her himself what had befallen the half-blind old man who had escaped her guardianship.

Serrill was not abashed, however.

"Yes," he said, "I call tell you. They're taking him to the police station. And if I have any influence with the courts he shall be sent to the insane hospital—where he should have gone long ago. He attacked me, and I knocked him down!"

He said it cruelly and with the evident satisfaction of giving her pain. The girl uttered a stifled cry and then stepped close to the superintendent, saying something in so low a tone that Drift did not hear.

Serrill uttered an oath and half raised his cane as if to strike her—and, perhaps, he would have done so had not somebody intervened.

They stood close to the door of the boiler-room. The passage between the shops was empty; but out of the boiler-room door there stepped a begrimed man in the dress of a fireman. One stride brought him between the girl and the railroad superintendent.

He was a heavy featured chap with rather dull eyes and coarse black hair which hung low upon his smutty forehead. He was below the middle height, but possessed long arms and a lusty body. Drift knew him to be Budd Phelps, a fireman in the shops.

"Super," he said, speaking as though he had not noted the official's action, and without as much as looking at Maria Monteith, "I got to show you something. I was just cleanin' up for the night, and I'm glad you come along."

Serrill recovered himself.

"All right, Budd; all right," he said, and turning his back on the girl, followed the fireman inside.

Drift went on toward the railroad yard. The girl stood undecided before the fire-room door and the young engineer, seeing her face more plainly, was fairly startled by her expression. Her gaze followed the departing superintendent—it was a blinding glance of hatred!

"James E. Serrill has an enemy there," thought Drift. "And she's got good reason for hating him, if all tales are true."

The young engineer caught the rear of the dog-house behind the evening freight just then steaming out of the yard, and dropped off at Hallett Crossing. The cottage over which Milly presided as a brisk little housewife, was at hand.

He sat in the kitchen after supper

listening to his sister's chatter as she washed the dishes and "tidied up" the already speckless room, trying in his own mind to put the fact of his discharge and the change that must come to them thereby into the gentlest phrases.

There came a sudden rap on the door. Milly ran in response.

"Why, it's Anse!" she cried. "Come in, Mr. Prendergast. How came you way up here?"

"No, no, Miss Milly," said the old man, leaning against the door-frame, as sheepish as a boy. "I can't stop. I come after your brother, miss."

"Oh, dear! It's more night runs, I know. I do wish the super would give you regular hours again, Tom."

Drift picked up his cap and went to the door, wonderingly. Old Anse was saying:

"I reckon he'll have a regular run after this, Miss Milly. He's called to take out the night express; he'll come back on the White Crow to-morrow—where he belongs."

"Oh, goody!" cried the girl, clapping her hands.

"What's this mean, Anse?" demanded Drift disturbed.

But Anse waited until the door was closed. He said:

"It's all right, son. I come up myself with orders for ye. I've had Smith get out a hand-car for us to go down on. You'll be in time."

"To take out the express? There's plenty of time. Besides—I don't know as I'll do it, Anse."

"You come down with me, anyway," said the old man earnestly.

"What for?"

"They want to see you."

"But Serrill discharged me—"

"Now, son, don't act the baby. Don't be a fool. I told him you could be depended on."

"Told who?"

"Ballington Serrill."

"Huh! Where's the super?"

Anse turned on him, put a hand on either shoulder, and leaning forward looked searchingly into Tom Drift's eyes. They were now within the radiance of the Crossing lamps.

"The super is dead, Tom. He was murdered not two hours ago, below there at the shops. Ballington Serrill is in charge of the division now."

CHAPTER III.

The Finger of Suspicion.

MAN'S mind is a strange machine. A fact put into it sometimes comes out strangely distorted by memory.

Somewhere, in the course of omnivorous reading, Tom Drift had come across a similar situation.

A quarrel between employer and employee; bitterness and rancor on both sides; then the death of the employer and the finger of suspicion—

"Where was he murdered?" he asked, in a voice which surprised himself, it was so unshaken and natural.

Inwardly he was trembling; on the surface there was nothing to excite Prendergast's comment.

"In the fire-room of the shops," said Prendergast in reply.

"How was it done?"

"They dunno yet, Tom. 'Tain't over two hours ago that he was seen alive."

"Right after the arrest of Jake Monteith?"

"Did you know about that?"

"I was there."

"Wal," and the old man turned from him hastily as the agent at Crossing station pumped the hand-car alongside of them, "don't tell anybody that."

"Eh?" queried Drift.

"Better know nothin'. That's my motto. In law it's giner'ly the witness that gets it in the neck wuss nor the culprit."

"What do you mean?" demanded Drift, looking Anse in the eye.

He feared to see there an accusation and his first thought was to boldly confront it to stare it down. The old man evidently understood him.

"Look here, Tom Drift," he growled. "You've got a soft heart; don't let it extend to yer head. Nobody's accusin' you of havin' anything to do with the super's taking off. You was home, warn't you?"

"How should I know?" queried Drift as he stepped upon the hand-car.

Prendergast followed him and they let the car rumble down the grade.

By and by the young engineer asked:

"Tell me how it happened?"

"That's what Captain Stranahan is trying to find out."

"Oh!"

"He'll ask you some questions, it's likely. He did me. They're examining everybody who spoke to the old man this afternoon, or who saw him. It seems a plumb mysterious thing."

"The watchman found him stretched out there in the boiler-room of the shops. There warn't a soul near, and he was dead all right."

"How was he killed?" asked Drift.

"That's what they'd like to find out. Haven't found anything but a bruise or two which he might have got when he fell. It wasn't long after the shops shut down that it happened. He'd been dead some time when they found him, and it warn't more'n eight o'clock."

"Maybe they'll never learn who did it," breathed the young man more to himself than to Anse.

"Huh! don't you believe that," declared the old fellow. "Murder will always out—like sap in a pine knot. In this case, it looks like an easy one. Surely somebody seen the murderer, whoever he was. They'll nab him quick enough. But it'll be a long day before the Big Boulder gets a boss that'll keep the repair expense account down like James E. Serrill did."

"It was that desire on his part that caused the accident to the White Crow this afternoon," grunted Drift.

"Well! let that fly stick on the wall. The man's dead," said old Anse. "And you take my advice, Tom Drift: don't appear to know too much about him or his end. Cap'n Stranahan didn't l'arn much from me, you bet!"

Prendergast's words buzzed in Drift's ears when he left the hand-car and crossed the yard to the station. Somebody must have seen the murderer!

Before the young engineer's mental vision rose the figure of Budd Phelps as he invited the super into the boiler-room during the altercation between Serrill and the daughter of Jake Monteith "to show him something."

Budd had long been a neighbor of the Monteiths. He was seemingly a stupid fellow; but he had worshiped Maria Monteith long before that unhappy girl took the step which had embittered her own life and, perhaps, wrecked her father's mind.

After she had returned home to care for her father, Budd had treated her just the same as before, and his dumb devotion was pathetic.

The fireman must have known the influence James E. Serrill had had upon the unfortunate Maria. And Drift had seen the fireman and the super disappear together into the boiler-room.

But he retained control of his features and followed old Anse up-stairs to the division offices. Ballington Serrill, his young face stern and white, sat talking with the chief of Logan City's police force.

"I got him for you, Mr. Serrill," old Anse said. "If you'll excuse me—"

"All right, Prendergast—all right," said young Serrill shortly. "I'm obliged to you. You can go." Then to Drift: "I wanted to see you, Mr. Drift; and Captain Stranahan may have some questions to ask you. You've heard of this terrible happening?"

"I've heard that the superintendent is dead—yes, sir."

"My poor uncle was killed, I believe, by some enemy—although the doctors as yet cannot state what actually caused his death. Now, Captain Stranahan?"

Ballington's manner was nervous. He eyed Drift aslant; but the young engineer was on guard.

"I merely wish to ask Mr. Drift when and where he last saw James Serrill," said the police officer slowly.

"Er—well; first of all," said Ballington hastily, "let me learn if Mr. Drift is in the mood to take out the night express. This is important. You understand, Drift, that you will be reinstated and will have your old run—the one Parsons has been having. Do you accept?"

"Certainly," said Drift promptly.

"Mr. Drift was discharged, then?" asked Stranahan.

He seemed not to look at the engineer; but the latter's expression of countenance did not change.

"A mistake," declared Ballington, with the same haste. "I tried to get him to reconsider it this afternoon. I am glad to welcome him back on the Big Boulder division," and he spoke with much emphasis.

Stranahan nodded and said nothing. The new superintendent seemed to be the only nervous persons in the room. He continued:

"Your old fireman has gone to the hospital, Drift. I shall have to give you a new man on 67. He applied for a change from the shops a month ago, and this seems a good chance for him. Here he is now."

Drift glanced quickly toward the door. Somehow the appearance of Budd Phelps did not startle him. The fireman slouched forward in his dull way.

"I've sent for you, Phelps," young Serrill said, "to give you a run with Mr. Drift. You'll go out on the express tonight."

"Thank you, sir."

"And Captain Stranahan," he waived his hand lightly toward the police officer, "would like to talk with you, too."

Ballington was recovering from his confusion. This was evidently a strained situation for him, too.

Drift had taken a chair. He believed that he and Phelps had been summoned to the office for a purpose. He steeled himself to show neither surprise nor fear, whatever should happen.

As for Budd Phelps, he looked upon Stranahan with a bovine gaze and said nothing.

"You saw the unfortunate Mr. Serrill just before his death, I understand?" asked the policeman.

"I reckon so, sir."

"Where was this?"

"In the boiler-room. He was talking to me. I was showing him how we needed a new compressed air-cock. The super was close about repairs, sir," and his gaze flickered for a moment on Ballington. "We couldn't get nothing new through the foreman."

"How did he seem?" asked Stranahan, his gaze anywhere but on Budd.

"Who—the super?"

"Yes."

"I guess I hit him at a bad time. He damned me—and the cock. I left him looking at it. Just then Gid Larrabee called me, for it was after six o'clock."

The police officer nodded.

"I went with Gid to Meehan's saloon."

"You left Mr. Serrill in the boiler-room?"

"That's what I said, sir."

"Did you see anybody else around the place?"

Phelps's eye flickered for an instant in Drift's direction, but he said without the least hesitation:

"Not a soul, sir—not a soul but Gid."

"All right, Phelps. You can go," said Stranahan, dismissing him.

"You can go over to the roundhouse, Phelps, and look over 101. No. 67 will be in the shops for a day or two yet."

The fireman withdrew. Ballington looked again at Captain Stranahan.

"Now for you, Mr. Drift," said the policeman, taking the signal. "You did not see the superintendent later than Phelps, I suppose?"

"No, sir."

"You may be called upon to say something at the inquest. Perhaps I'd better not ask you too many questions now."

"I do not see—" said Drift beginning hastily, and then stopped.

"You do not see what, Mr. Drift?" said Stranahan briskly.

"I do not see what connection I can be supposed to have with the matter."

"I don't suppose that you have," said the policeman, with an expression of great frankness. "But you were seen near the superintendent just after that little fracas on the street when he knocked that crazy man down. Everybody remotely connected with the incident is being questioned."

"What was done with poor Monteith?" asked Ballington Serrill quickly.

"He raved so that we immediately sent for the hospital ambulance and they took him away," said the chief of police.

Then he turned again to Drift:

"You see, Mr. Drift, there may have been no murder after all. Mr. Serrill's death may have been caused by apoplexy. There are no marks on the body—that is, no marks to show that he was attacked."

When Drift was outside he reviewed the scene in the superintendent's office with frowning brow. He knew that there were suspicions in the minds of Ballington Serrill and Captain Stranahan.

Were those suspicions aimed at him? Were they aimed at Phelps?

He and Budd had been brought into the office together for a purpose.

How much did Stranahan and the new superintendent know of the truth, and how much did they suspect?

"They are groping for a motive for the crime—and a crime has been committed, despite Stranahan's final comment," thought Drift. "That talk of apoplexy and the like is all bosh!

"There must be other witnesses who have connected Phelps or me with the murder. Old Prendergast acted funny.

"But I believe I can prove an alibi. The crew of the freight will remember that I went up with them to the Crossing. Serrill must have been killed after that—hold on! Perhaps not. Or, perhaps, they can never establish the exact time of his death."

He stood still in the darkness and thought. A chill of apprehension seized him. He could not shake off its grip.

"Perhaps the super was already dead when I boarded the freight. He may have been struck down immediately after he and Phelps stepped into the boiler-room."

The thought was forced upon him. It brought to the surface again that which he had been trying to stifle.

James E. Serrill had knocked down Jake Monteith, had threatened his daughter—whom the dead man had already injured and, therefore, hated—and Budd Phelps had stepped between the angry man and his victim as Drift passed by.

Phelps himself had admitted that he was alone with the superintendent in the boiler-room. Gid Larrabee had called him from outside.

The only possible witness of what occurred between the fireman and the man now so strangely dead, was Maria Monteith. Drift wondered if Stranahan had questioned the mad engineer's daughter?

These facts pointed to one result—and to one man. Serrill had injured Maria Monteith; Phelps loved the girl—even after she had been cast off by the superintendent.

Drift believed Budd Phelps guilty of the murder.

It was an awful thing. Drift felt the sweat standing on his brow and limbs and he shook as though with an ague.

Suppose he was called as a witness? Suppose suspicion was already fastened on poor Budd and an attempt would be made to prove, through *his* testimony, that the fireman was the murderer?

Hounded by these two fears—first, that he might himself be suspected of the murder; second, that his evidence might be needed to entangle Phelps—Drift proceeded down the yard.

There were many flaring lights and much running to and fro at the round-house. When he drew nearer he found that the 67 had been derailed on her way to the repair shop, and the men getting out 101—which he was to drive.

Fortunately all the wrecking crew had not gone and the great crane on its flat car was particularly handy. The boss of the gang wished to use this huge machine in getting the derailed locomotive back on the track.

Haste was imperative, for the western-bound night express—the train Drift expected to pull out with 101—would soon steam into the station.

Drift put aside the thoughts which had been troubling him and went to the aid of the wreckers. He mounted to the top of the boiler of the damaged locomotive and secured the sling that had been carried under the machine.

This sling must be hooked by the arm of the crane, which could lift a hundred tons as easily as Drift could raise a ten-pound dumb-bell.

In the noise of escaping steam from several locomotives, Drift did not hear the starting of the donkey that controlled the crane, and his back was toward the swinging arm. In a half-stooping posture, clinging to the chains, he first heard the frightened shouts of those on the ground who saw his peril.

Drift straightened up—still unconscious of trouble—and glanced over his shoulder. The huge arm of the crane was almost upon him. If he was struck by that mass of steel he would be crushed like a shell!

He could not climb down; he must jump. Thought is quicker than the lightning's flash.

On the ground beside the derailed locomotive was a tangle of rails and iron work, and it was twenty feet below him. To leap seemed certain injury—perhaps death!

And in that flash of hesitation a voice rose above the horrified shouts of the workmen:

"Jump! Jump, Tom Drift! Jump for your life!"

Drift saw a man bound across the intervening tracks and plant himself just beneath him, holding up his arms to catch the engineer. Then the engineer leaped, feeling the breath of the swinging crane-arm on his cheek as he did so.

He crashed into the arms of the man below and they went to the ground together. It was a mercy the under man was not badly injured; but he was first on his feet and helped Tom Drift to rise.

"That was a near call, sir," he said, and the breathless engineer looked wonderingly into the countenance of Budd Phelps!

It was the first thought Drift had as he arose:

"I can't testify against this man; he's saved my life. I must keep my mouth shut."

He gave Phelps his hand involuntarily.

"That's all right, Mr. Drift. You'd ha' done as much for me," said the fireman simply.

There seemed nothing more to say. The work of getting the derailed locomotive back on the track was continued, so 101 could be pulled out.

Meanwhile, Drift had given the machine he was to run a searching inspection. Notwithstanding the fact that Budd Phelps had never been a tallow-pot, the machine had been perfectly groomed and oiled. Drift could find no fault.

The train from the east came into the Logan City terminal on time and they backed 101 down to the station and she was coupled on. The 101 was not like his own old 67, and Drift did not know what he could do with her—or with the train she was to pull.

What his engine could do, or what Budd Phelps could do as stoker, did not hold first place in Tom Drift's thoughts, however, and he wondered what was uppermost in the mind of his fireman?

The starting gong sounded and Drift opened the throttle gently. The tail of cars moved easily. Glancing back along the platform, the engineer saw Ballington Serrill watching their departure. The sudden death of the super had dropped a heavy mantle of responsibility on the young man.

There was not a flicker of expression on Serrill's face as he saw Drift at the window of the cab; but Drift, as he drew in his head, was sure that the new superintendent's mind was fixed on *him*.

The engineer's own gaze sought the stooping figure of the dwarflike Budd, who had now dropped the bell-cord and was breaking coal in the gangway.

Was it a fact that he was riding in this locomotive-cab with the murderer of James E. Serrill?

CHAPTER IV.

"That Fellow's Sister."

BALLINGTON SERRILL had his uncle to thank for his rapid advancement in the employ of the Northwestern and Pacific. That fact had really been the only tie, save that of blood, between the dead superintendent of the Big Boulder division and his efficient assistant.

Ballington knew and disapproved of the private life of James E. Unlike Tom Drift, he would likely have dodged the issue if Sara Longstreet had come to *him* with questions regarding the rumor of James E. Serrill's entanglement with the daughter of poor, blind Jake Monteith.

But, then, Ballington had not known Miss Longstreet all her life as Drift had.

Therefore, the younger Serrill was well aware of the basis of the trouble between his uncle and the engineer. And knowing there had been this bitter quarrel, Ballington was the more troubled by the story of Captain Stranahan that Drift and the dead man had "quarreled over a woman."

"Guess we won't say who the woman is; she's pretty well up in society," the policeman said.

"I don't think it wise to mention her name—no," said Ballington, shortly. "But you're jumping at conclusions. You've got no proof."

"I've got no proof that Mr. Serrill was murdered—yet," said Stranahan. "But I've got my suspicions. He had enough enemies, God knows! There is another set of clues, pointing to quite a different party. And about another woman."

Ballington Serrill flushed. "I know

that my uncle was mixed up with some mountain girl—"

"Married her, sir—married her. No doubt of it. He must have been drunk at the time, though 'twas no more than he should have done. She was decent enough till he got her away from home. She lived in a house he hired over in my district for a while. You see, he fell in with her when he first came up here to boss the straightening of the Big Boulder. Everybody knows about it."

"What has *that* to do with the death of my uncle?" queried Ballington.

"Nothing. But there's a fellow—"

And then he told his suspicions regarding Budd Phelps. Result: the confronting of the engineer and fireman as previously shown.

But nothing came of it; at least Stranahan would not admit he had made anything by the examination of Drift and Budd Phelps. As for Ballington Serrill, he felt ashamed of his part in the affair.

He went down to see the night express start, with Drift at the throttle of 101, half tempted to say something to the young engineer. But there was Phelps within hearing, and the acting superintendent merely stood and watched the express pull out.

As the last car rolled by and he turned back toward the street, he observed a woman's figure hurrying through the already scattering crowd.

"Miss Longstreet!" ejaculated Ballington, confronting this lady.

"So I just missed him!" she exclaimed, breathless.

She gave him her hand, and her hurried, excited manner assured Serrill that she was here unattended.

She was a tall, gracefully formed girl, quite as old as Serrill himself, and he was still under twenty-five. She had an air of assurance and a freedom of manner which he had never exactly understood. The breeziness of this Western girl, which no seminary polish could hide, did not appeal to him.

"Who did you look for?" he asked slowly. "Surely, you were not going on that train?"

Although her face was in smiles he saw something beside mere welcome in her full, dark eyes. They looked troubled.

Her sweeping gown she had caught up with one hand; but it was mostly covered by the long silk garment she wore over it.

"I am on my way to the Scott's affair," she said. "But I was desirous of speaking with Mr. Drift. Milly telephoned me that he was taking out the express, to-night."

"The express has gone, Miss Longstreet," said Ballington gravely.

"So I am too late!" However, she could not continue that forced lightness of speech. "He—he really is on that train, Mr. Serrill?" she asked, in some anxiety.

"Mr. Drift certainly is in the cab of 101, pulling the night express to Big Boulder," declared the acting superintendent, in some wonder.

"One hears so many garbled stories—rumor flies so fast in this town," she sighed, but the relief in her face was plain enough.

"You have heard of this terrible tragedy, Miss Longstreet?" he ventured.

"Your uncle? Yes!" She looked earnestly at him. "Is—is it true? It has come to my ears that Mr. Serrill was—was murdered."

"We fear so," admitted Ballington, "but the coroner has not learned how it was done."

"But there is no doubt that he was killed?" she cried.

"I say, we fear so," said Ballington doggedly.

"But my mother's maid came to us with the name of the man they think did it."

"Then she knows what nobody else knows," declared the acting superintendent, with some surprise.

"I—I feared he had been arrested. Of course, it could not be true! You know whom I mean, Mr. Serrill."

He could not deny it. "You are thinking of Mr. Drift?"

"Yes. Tom Drift. I know that he and your uncle quarreled. My foolish mother told your uncle that Tom had undermined him with me. It did Tom harm."

"I know nothing about that, Miss Longstreet," said Ballington stiffly.

Her frankness seemed crude to him. He could not understand a young lady speaking so plainly.

"If anybody is wicked enough to believe Tom Drift capable of committing a crime—*such* a crime," said the girl, earnestly, "I want you to know that all I have—all the fortune I own—is at his disposal for defense. I will go bail for him to any amount—if bail is obtainable. And his sister! Milly would go mad if anything happened to Tom."

"Ah! his sister—yes," murmured Ballington Serrill.

"You have met Milly, Mr. Serrill. She was visiting me once when you callled. You remember what a dear girl she is?"

Ballington had a vivid remembrance of Tom Drift's sister. A fluffy-haired, sweet and childlike figure, low toned and gentle. Much different from the aggressive Miss Longstreet.

"Think how Milly will suffer if this story about Tom is circulated. I got her on the phone the moment mother told me the story. She knows nothing about it yet."

"It is an idle tale, I believe," said Ballington huskily. "It is true that Drift and my uncle did not get on well—in fact, Drift was discharged this afternoon."

"Oh!"

"But I have reinstated him and he has been given his old run again—the night express to Big Boulder and the White Crow return."

"Oh, thank you!" cried Sara, her face lighting up. "That act tells me better than words what you think of such a preposterous accusation. But you know mother; she is very, very unfair at times. And she never liked Tom"

"I would not worry about it, Miss Longstreet," he said, trying to speak cheerfully.

"Thank you! I must run back to the carriage now. Mother will be quite horrified by my stay, as it is."

She disappeared. Serrill walked moodily out of the station.

"If anything happened to Drift, that young lady would suffer keenly," he thought. "But how about the fellow's sister? Such a pretty little thing!"

He said it tenderly. A vision of Drift's sister rose before his eye. "No! She would suffer the most if Drift got into trouble over this thing. Poor Milly!"

He went on, as he intended, to the undertaker's rooms to which the body of James E. Serrill had been removed. The physicians had just finished with their autopsy, and their report threw little upon the mystery of the man's death.

Apoplexy was impossible. James E. Serrill had died of no known disease

Although there were only superficial bruises—notably on the back and shoulders—the doctors declared that death had been brought about by some violent blow which had ruptured his heart.

The blow had been delivered on the front of the victim's body. Yet the flesh there was not bruised—only reddened. His clothing had not been disarranged; nothing had been removed from his pockets.

It was as though some giant fist had smote him and left him lying there in the boiler-room of the shops. Nothing else but that he was dead, and had died instantly, was really known.

Dazed by the seemingly deepened mystery, Ballington Serrill went to Captain Stranahan again, late as the hour was.

The police had searched the scene of the tragedy minutely. The fireman, before leaving, had cleaned up and made everything orderly for the night. Not a tool was out of place. The fires had been drawn and the ashes wheeled out Everything—even to the fire-hose and the air-pipes coiled in their frames on the walls—was as it should be.

The night watchman coming in had found the body of the unfortunate super lying against the north wall as though it had been flung there by the force of the blow which had killed him.

Murder had been committed. By whom, or how, Stranahan and his assistants were not prepared to suggest.

"But we'll get the fellow—soon," declared the confident chief of police.

"I sincerely hope so," Ballington remarked, as he started for his hotel.

But did he mean it? He thought of the little girl up on the mountainside at Hallett Crossing. What would become of her if Tom Drift was proven guilty?

"A gruesome thought!" muttered Ballington Serrill. "Why he rather than Budd Phelps?"

His mind was with the two men in the cab of 101, shrieking across the Pioco Range and down into the valley beyond the mountain wall into Big Boulder, the terminus of their run.

"If either of them is guilty, I hope he does not come back," was the final thought of the acting superintendent.

CHAPTER V.

In the Cañon.

TOM DRIFT, on this night that the superintendent of the Big Boulder division had been so mysteriously struck down, was hampered by a lack of knowledge of his engine as well as a doubt regarding the capabilities of his stoker.

But, like the practical fellow he was, he began studying both before passing Logan City yard.

The 101 charged the grade pluckily. The string of cars was a long one, but the big mountain creeper steamed easily.

As for Budd Phelps, he went about his business with some appearance of knowing his duties. Plainly this was not his first experience in the gangway.

Up and up the train climbed, past the darkened stations which now and then were set down on the wooded mountainside. The grade was not steep all the way; there were plateaus on which were settlements of some size.

They crossed the steel trestle over the Big Boulder with thunderous roar. Below, the tumbling waters flashed white.

Across the basin ahead, far, far in the distance, the engineer could see the glow of the electric lights on the clouds above Big Boulder City.

Down the western skirt of the saddle the train shot, and dashed along the floor of the basin, where the noisy river spread out into a series of placid lakes on either side of the right-of-way.

For miles the rails were laid on trestles. This route was the more direct. It had been built since the Northwestern and Pacific System had taken over the Big Boulder division.

The waters of the lakes lapped the trestles; but the underpinning seemed to be secure. The train passed over the water for several miles—and in time of storm, Drift had known the waves to wash completely across the tracks!

Just now, however, the young engineer had little thought for anything but the time he was making and the humors of No. 101. He knew how to coax along old 67 and get the best there was out of her; but he brought the express into Big Boulder that morning ten minutes late.

During the long trip from Logan City, the fireman had scarcely spoken; but that seemed to be only his usual manner. If he were guilty of the murder of James E. Serrill, he appeared serene.

"If he's guilty, now's his time to get away," thought Drift.

He wondered if he would have to put in a call for another fireman for the return trip. Meanwhile he went to a house he had previously patronized, and went to bed. He could be pretty sure of four hours on the hay in Big Boulder each forenoon.

When he was called to take out the White Crow, he went down to the roundhouse where the freshly groomed 101 stood. Budd Phelps was there.

"Is he a fool, or is he innocent?" doubted Tom Drift. "If he goes back to Logan, they'll jug him sure!"

He could not speak to Phelps about the murder, however. Had he done so, Drift feared that he would have shown by his manner whom he suspected.

The flier came in from the west on time, and the engine that had pulled her rolled panting down to the roundhouse like a spent racehorse. Her eagle-eye leaned out of the cab window and shouted to Drift:

"Hi, Tom! I hear you've got back your old run. Good luck to you, boy! She's on the notch here; see how much you can lose getting her over the saddle."

But Drift was determined not to lose time if he could help. He had studied No. 101 coming over; and a daylight run and clear track would make the trip east much less difficult.

The White Crow was made up of a baggage and express-coach, a day-coach and smoker, three Pullmans, and an observation-car. It was a light train and, although after crossing the basin the rails climbed several steep grades in getting over the saddle, on the eastern side of the range it was an easy slide down into Logan City.

This run between Big Boulder and the eastern terminal of the division was one

of the fastest on the whole N. and P. system, and this same White Crow flier went from end to end of the N. and P.

The 101 needed no coaxing across the flats of the basin and over the bright waters of the chain of lakes into which the roaring Big Boulder emptied; but as the big locomotive bucked the first grade, Budd Phelps began to get busy.

"She's a hog for diamonds, Budd," said Tom Drift.

The dwarflike stoker bent to the task.

They struck Mad Horse Cañon, wherein the rails followed the river for some miles without crossing it, and Drift had held her to the time. The cañon, as far as the road followed it, was as straight as an arrow; but before the rails crossed the boiling river by trestle and entered the break in its eastern wall, the right-of-way curved around the west side of that basin in the hills known as the Big Squaw's Cooking Pot.

Elsewhere the cañon was narrow, with towering walls.

Through the narrow channel the river roared, its spray dashing at times across the rails. And, to-day, the flood was particularly high. There had been heavy rains in the hills for several days, and now black clouds overhung the peaks and even the saddle.

As Tom Drift leaned from his cab he saw the lightning playing in the drab-edged clouds above the peaks, like trout jumping in a mountain lake. The heavens seemed to have settled down upon the heights; the clouds, heavy with rain, threatening to engulf the whole range.

"It will be tough in this cañon before night," muttered Drift.

Scarcely had his lips formed the muttered words when a puff of smoke or steam seemed to fill the head of the cañon beyond the Cooking Pot, toward which the train was hurrying, and a sound as of a mighty wind beat down the clash and rattle of the machinery.

The cloud rolled down upon them with terrific swiftness. Budd, looking from the other side of the gangway, uttered a shrill yell.

"A cloudburst! See that, Drift?"

The engineer could not fail to see the threatening wall of water which, higher than the stack of the 101, was charging down the cañon. And he understood the peril quite as quickly as the fireman.

There had been a cloudburst in the range.

Thousands of tons of water had poured down gullies and courses draining the bald crowns of the mountains, and these estuaries emptying into the bed of the Big Boulder, had suddenly swelled that stream to enormous proportions.

What had at first seemed to be smoke was — within the few seconds — transformed into a white wall of water, the crest of which curled like a tidal wave high above the usual level of the Big Boulder.

It swept the cañon from wall to wall, bearing down upon the flying train so swiftly that it was plain to both the eagle-eye and the fireman that to reverse the locomotive and try to escape by running back out of the cañon would be a useless proceeding.

Drift glanced at Budd Phelps. The fireman's face was white, his eyes glittered, but he seized his shovel with an unshaken demeanor.

The engineer pointed ahead. The roar of the approaching avalanche of water drowned all speech. Budd nodded.

Instantly Drift "let her out" to the last notch while Budd began feeding the furnace like mad.

Both men in the cab saw that retreat was useless; they caught at the single straw of hope that came within their reach.

If the flier could reach the circular pocket in the cañon, the Squaw's Cooking Pot, before the flood caught her in the narrow part of the cañon, the water might be so spread out and reduced in depth that the cars would remain on the rails while the flood swept past.

The Cooking Pot was not far ahead; but the rushing water had almost reached this basin.

So imminent a catastrophe would have shaken the bravest soul. Tom Drift felt the responsibility of the train and its passengers in his heart and on his mind.

Death bore down upon him—death in a most terrible form; but he charged the wall of water with his hand gripping the throttle — a hand that showed no tremor!

(To be continued.)

A SHOT BUZZED DOWNWARD AND PRETTY CLOSE TO HER HEAD.

How Cooney Made the Border.

BY EDWARD T. GLYNN.

It Was a Lucky Shot All Right, Thought the Bandit, as He Took Shank's Mare for the Open.

WHEN Dolly Daggert glanced up and recognized in the tall, lean, uncouth stranger who had just stepped into view around the corner of the cabin, Cooney, the outlaw — the very man whom her husband, Sheriff Jim Daggert, was just then searching for out among the foothills — she dropped her hands, gasped a little frightened cry and started up from the low wooden bench.

As she did, a glint of steel flashed suddenly from Cooney's hip and a shot buzzed downward and pretty close to her head. A moment later, as she straightened up, speechless and trembling, Cooney holstering his .45, stepped forward, smiling.

"Jumpin' Jehosaphat! ma'am, but yuh almost queered the best shot I ever made," he said in an easy drawl. "Yuh-huh, ma'am," he continued smilingly, "that shot come so near taking off the wrong head my bones are rattlin' yet. There he was, the varmint, all coiled up, ready to strike, when up yuh jumps right plumb in the way. I thought you'd get it first—right where he got it hisself—squar' in the gullet."

The newcomer gave a little indicative nod and Dolly, turning slowly, compre-

hended the situation in one quick, horrified glance.

Just behind her, its chubby hands dabbing at its half-opened eyes, was a baby. Thrashing about, just a foot or so beyond, was the headless body of a rattlesnake. Near by was a cluster of rocks from which the snake presumably had ventured.

With a little cry Dolly ran to the child, snatched it up and pressed it against her bosom, mumbling motherly words in self reproach.

The outlaw, still smiling, crossed over, buried the toe of a heavy boot under the snake's belly, and kicked it back among the rocks. When he faced about he grinned placidly into Dolly's wondering but grateful countenance.

"That's all right, ma'am," he drawled, knowingly. "Yuh needn't bother none to thank me—none at all. First place, it's mebbe I ain't worth it. Second place, yuh wouldn't do it nohow, case yuh knew my name. Bein' so, just suppose yuh get us a feed and we'll call it a bet. That little shot, ma'am, I made on an empty stomach."

As he paused, his leering grin still fastened insolently on her face, Dolly, conscious of something else besides humor in his words, shifted the child in her arms, hesitated a moment, and then walked toward the cabin.

"All right," she said simply, "come inside."

The outlaw, awaiting no further invitation, followed. Dolly leading, they entered a big, low-ceiled room that occupied most of the ground floor of the cabin.

Once inside, the outlaw seated himself at a table built against a wall near a window. Slouching forward on his elbows, his revolver within easy reach, he at once opened up a conversation. Dolly, deigning just the briefest of replies, placed the child in a crib and busied herself with the meal.

As she did so, the outlaw, watching her through his slitlike eyes, continued his flippant remarks, seemingly indifferent to the fact that most of them passed unanswered. Once served, however, he lapsed into silence, greedily devouring the food placed before him.

Every now and then he looked up to scrutinize the trail or cast a curious glance about the room. The smile never left his lips, neither was it really good to see. Once or twice he ceased gorging himself long enough to grin at the child. Of Dolly's presence he appeared utterly oblivious, yet, instinctively, he was conscious of every move she made.

Seated across the room, she wrestled with her thoughts as she covertly watched him eat, her face a study of swiftly changing expressions.

On the one hand, prompted by a feeling of gratitude for his act in saving her child from possible death, she was tempted to assist him—murderer though she knew he was—in his race for the Mexican border, for which place she knew he was headed primarily for his "health."

On the other hand, however, prompted by thoughts of the $1,500 reward which she knew was being offered for his apprehension, dead or alive, she was just as strongly tempted to hold him captive until the return of her husband.

In a silence that rapidly became oppressive, she pondered, and her decision was hastened by the recollection of a promise which her husband, the sheriff, had made only that morning when starting for the hills.

"Dolly, dear," the promise came back to her, word for word, "if I get that cuss to-day, you and me and the kid gets that little ranch you've often dreamed about. I'll chuck this job o' mine higher than a kite; so high it'll never come down. I'll do that, Dolly, so's you won't need to worry no more. If he's out there, girl, I'm going to get him. Dolly, I'm a-going to get that reward for you and the babe."

Yes, she decided, it was best—best for all concerned—that she make this man a captive. After all, she reasoned, his act in saving her child from possible death, notwithstanding, he deserved but little if any consideration.

Was he not a murderer, a thief, an acknowledged menace to society? Were not his crimes, which included some of the blackest in the State, unforgivable in the eyes of law and man alike?

Moreover, if allowed to go, was it not likely that he would continue, to the possible loss and sorrow of others? Under the circumstances, why then, even out of gratitude, should she let him go?

As one who weighs a final decision, Dolly leaned forward in her chair and watched the outlaw for some moments. As she did, she gripped the 38-caliber revolver which, unobserved, she had slipped into the capacious pocket of her apron while preparing the meal. A semblance of a smile curled her lips as, covertly, she scrutinized her gluttonous guest.

That her nerve was equal to the task she had in mind she did not doubt. Dolly was born of courageous stock and reared in a country where courage was contagious. Once she had the drop on the outlaw, an advantage which she smilingly observed would be easy to obtain, he would readily capitulate.

Her personal knowledge of "bad" men assured her that she was right. If he didn't surrender, a possibility which, of course, still remained — Dolly's smile changed to one of grim resolution as, mind made up, she moved to arise.

At that moment, however, the outlaw, turning unexpectedly, startled her back into her chair. As she caught her breath, wondering if he had divined her object, he leered at her. As he spoke, holding out an empty cup, Dolly breathed again in evident relief.

"Hope yuh won't think I'm a hog, ma'am," he drawled, "but could yuh draw us off another mug of tea. This 'thirst o' mine sure makes me feel 'shamed of myself—especially when I'm round where the liquor's scarce."

He allowed his grin to penetrate the woman another brief instant; then, as she hesitatingly rose he swept it toward the child. He winked ponderously as the baby, gripping the side of its crib, giggled in childish amusement at him.

"Yuh little rascal, yuh," he chided good-naturedly. "So that's what yuh think o' me, eh, after what I did for yuh—givin' me the hoss-laugh."

At this remark Dolly, then reaching for the outlaw's cup, suddenly experienced a new emotion.

Something about the scene that she beheld just then—the hardened criminal

"I DON'T EVEN KNOW THE CUSS WAS THERE!"

shaking a finger in playful reproof at the cooing child—struck her as pitiful.

In a flash it occurred to her that, after all, in plotting the outlaw's capture, she was guilty of gross ingratitude. In this sudden reconsideration her heart filled with motherly compassion, all thoughts of the badness in the man fleeing from her mind.

With a little shudder of self-reproach she pictured herself surrendering to the law for a money reward—which she re-

"STAND BACK—BACK TO THE WALL!" SHE ORDERED.

luctantly admitted was her basic motive —this man who, without any consideration for his own safety, had protected her child.

Then as the full meaning of her contemplated act dawned upon her — the realization that his capture, eventually, might mean his life — her face suddenly lighted with new sympathy.

In another moment she turned away from the scene which abruptly had wrought a change in her mind, walked to the stove and filled the cup. Returning, she placed it beside the outlaw's plate.

A commiserating smile on her lips, she stood silently watching the renegade who, seemingly oblivious to all else, was still catering to the child's amusement. After a moment, as though loath to interrupt, she spoke, her voice softened by a new note of solicitation.

"Is there anything more you'd like?" she asked. "Had enough — all you want?"

The outlaw slowly turned in his chair. His eyes swept the scene of devastation on the table before him. He met Dolly's querulous eyes with a comical grin.

"Plenty, ma'am," he answered briefly. "Plenty. Just wanted this"—he raised the cup of tea—"to slosh down; that's all

'Ain't room enough there," he patted his paunch with a knife, "for a case of indigestion. Besides, I got to mooch it right along."

Under his leering gaze Dolly felt a blush of resentment come suddenly to her cheeks. It quickly faded, however, when the outlaw, turning back toward the table, resumed his silent contemplation of the trail.

For a moment Dolly was absorbed in meditation. A new idea in mind, she then started across the room. Half-way she paused, turning toward the outlaw again.

"If you can wait," she said, questioningly, "I'll do you up some sandwiches. Perhaps you'll need them—if you're going far," she added, a bit grimly.

"All right, ma'am, if yuh would." The outlaw spoke without turning. "Fix 'em up with lots of mustard, too, if yuh will," he added. "Don't know but what they would be handy, come to think of it, case anything does happen so's I can't stop off some place to-night for supper."

At something in the outlaw's sarcasm Dolly gave a little start. If something happened! If something happened! As the words flashed back across her mind her heart grew numb. Of a sudden her thoughts went out to the hills, to the man among them, to the husband, the father, the sheriff, trailing down this selfsame outlaw—for her and the babe!

In a swiftly moving mental panorama she pictured a scene that chilled her blood—a scene that left her momentarily dazed in the sudden realization that, should it prove an actuality, she would have to stand the blame. It was a scene wherein she saw the two men meet the outlaw and the sheriff—saw them blend their fire and saw the sheriff fall.

With a new resolution in mind, Dolly placed on a shelf a knife with which she had just started to cut some bread, slipped her hand into the pocket of her apron, and slowly turned about.

An exclamation of mingled surprise and alarm escaped her lips at the tableau she beheld.

The outlaw, partly standing, was leaning across the table, his face against the window. Except for the nervous twitching of the fingers closed about the handle of his .45, his poise was ominously tense.

In the silence of the room Dolly heard muttered oaths oozing through his lips. Her heart seemed to stop beating lest he catch her cry. With one quick, comprehensive glance through the open door she looked again at the outlaw, smiled grimly, and drew her revolver.

As she stood with the weapon leveled toward his head, she cast another hasty glance out on the trail, down which, partly concealed in a cloud of dust, galloped a troop of horsemen.

One, the sheriff, was fully fifty yards ahead of the others.

Then, glancing back at the outlaw, now straightening up, the smile gone from his lips, she cleared her throat.

The command which she uttered rang out like a pistol-shot in the stillness of the room.

"Drop that gun! Hands up! Quick! You're covered!"

With a startled oath the outlaw wheeled around, lashing the woman with a look of mingled surprise and rage. In

the one brief moment that he stood irresolute, his gaze lighting significantly on the now sleeping child. Dolly, her heart pierced by a new and sudden fear, cocked the weapon.

Prompted both by the warning click and the resolute gleam in the woman's eyes, the outlaw then let his .45 clatter to the table and raised his hands.

As he did, the corners of his mouth twisted into a malignant smile.

"Well, ma'am, I 'low you've caught me foul all right, all right. Couldn't 'a caught me better if I'd come here all tied up like a birthday gift." He paused a moment; then added in bitter self-denunciation: "Shows what an ass I was to waste my last shot like I did."

At this remark Dolly's expression suddenly changed. Through eyes closely squinted she swiftly searched his face.

"You—did—that?" she asked slowly.

A sneer replaced the outlaw's smile.

"Well, ma'am, if I didn't, yuh don't suppose I'd be standing here like this, like a statue of Liberty, do yuh?" he growled.

Dolly, her brain working rapidly, glanced quickly from the outlaw to the trail; then back to the outlaw again. The horsemen were now within two hundred yards of the cabin. Their nearness seemed to hurry her decision.

"Stand back—back to the wall!" she ordered suddenly, moving toward the table.

The outlaw obeyed, fully surmising her purpose.

"If yuh think I'm a liar," he said, "there's the old pea-shooter—it's—"

Ignoring the remark, Dolly, her pistol still trained on the outlaw, quickly snatched his gun, glanced hastily at the empty chambers, and then dropped the weapon in the pocket of her apron. With another hasty glance outside, she cried:

"Quick—into that closet! Quick—before they come! Perhaps I'm a fool—but I'll give you a show!"

Cooney blinking in wonderment, hastened to obey.

As the closet door shut softly behind him, Dolly lowered her revolver, smiled reflectively, and walked across the room. She appeared in the doorway of the cabin just as the first of the horsemen prepared to dismount.

She caught his eyes and signed him back into the saddle.

"Jim, you've missed your man by half an hour," she said calmly. "Get a wiggle on and you'll catch him over there in the hills to the east—unarmed!"

At the wondering look in the sheriff's face Dolly stepped outside, produced the outlaw's revolver, and laughingly told a story that alternately moved the sheriff and his posse to smiles and oaths. At its conclusion the sheriff, pulling his horse around, issued an order and the posse galloped away.

A few minutes later, when Dolly, revolver in hand, again faced the outlaw, she spoke with a trace of mockery in her tones.

"You needn't thank me for this, Mr. Cooney," she said, meeting his gaze with a quiet smile. "Just thank yourself for having done at least one good turn—one for which I'm now doing you another."

She waited a moment, then added in tones of sudden finality: "Now, then, I guess that's all. I don't believe you'd better wait even for those sandwiches. I think you'd better go right now, instead. Make west—the posse's riding east—and you'll get away. Now—just mooch!"

An hour later, as he made his way to safety in the western hills, Cooney was moved to merriment.

"What makes me laugh," he chuckled half aloud, "is that I didn't mean to get that reptile at all. Didn't even know the cuss was there. I see the woman jump, s'pose she had a gun, and just let fly offhand. It was a lucky shot all right—a lucky shot!"

[illegible] FOUR MINERS

QUEEN MARY RIDES ON A HAND-CAR.

DURING their recent tour of the southern mining districts of Yorkshire, King George and Queen Mary journeyed to Axwell Park and visited the Silkwood Pit of the Dalton Main Colliery. After watching the freshly mined coal emerge from the shaft at a rate of three hundred tons an hour, the [illegible] the weighing and [illegible] to the screening-house where the coal is broken and [illegible] sorted. The queen [illegible] the screening house, but the king [illegible] interesting [illegible] the distribution of coal. While he was so [illegible] the queen expressed a wish to visit the engine-house. No conveyance which seemed to be suitable for the accommodation of the queen was at hand, and as the representatives of the colliery did not wish her to make the journey on foot, a section-gang's hand-car was placed on the rails leading to the engine-house. Accompanied by Lady Fitzwilliam, her hostess at Wentworth Woodhouse, and Lady Eva Dougdale, the queen made the trip. The hand-car was propelled by four men

VALUE OF FIRE-BOX VOLUME.

Why the 1655 of the Central of Georgia Railway Is a "Free Steamer," the Delight of the Fireman's Heart.

SINCE the size and weight of locomotives have so greatly increased, designers and builders have been denied the privilege of merely resorting to added bulk for increased efficiency. On many roads the limit in height and width has been reached, and even increased length can scarcely be further possible.

This condition is prominent on the Santa Fe, Baltimore and Ohio, Delaware and Hudson and other roads where the enormous Mallets are in evidence. A casual view of the situation now clearly indicates that the future development of the machine must be within itself and not through the addition of wheels and inches.

Better Steaming Qualities.

It was known, of course, to the far-seeing locomotive designers of ten years ago that the limit in size must be reached some day, although few of them believed that the day was close at hand. Nevertheless, more than one mechanical engineer and superintendent of motive power went quietly to work in anticipation of what the future might bring forth.

The necessity for securing better or, at least, more dependable steaming qualities was quickly recognized, but until a comparatively recent date such efforts were confined to experiments with different front-end arrangements, stacks of varying diameter, and possibly every patented exhaust-pipe in the country was given a trial.

Considerable good materialized from this research work, and certain standards became established where practically many important details were at random and at variance even between two connecting roads.

Prominent among the successful attempts to add what may be called additional constitutional strength to the engines was the development and large adoption of the superheater. Owing to a peculiar property it is possible to add to the heat of steam after it has separated from the water from which it was generated.

If this superheated steam is thrown in contact with a cooling surface such as the cylinder, the additional degrees of heat, or the superheat, must first be dissipated before the usual condensation takes place, thus obtaining greater efficiency than can be obtained from a given volume of saturated steam of the same pressure.

For a long time after the first superheaters were applied nothing like general interest could be claimed for them, but at the present time there now seems to be a general determination to superheat by wholesale as there was to compound some years ago.

The next prominent feature in the line of development was the revival and now very general use of the brick arch in the fire box, which has for the end in view to delay the unconsumed gases from reaching the flues and escaping unburned until they would have an opportunity to ignite. A marked gain in fuel economy results from the installation of this device when properly applied, and they have been greatly improved over the original design.

In the 1655, the new Baldwin built for the Central of Georgia Railway, which has been making a wonderful record for fuel economy and general efficiency, are embodied other progressive ideas which, no doubt, will prove as significant in results [illegible]

The distinctive feature in this engine is a plan to secure greater fire-box volume and deflection of gases which personal experience of the motive power management of that road had convinced were most important factors, although heretofore they had largely been lost sight of.

Running with Original Flues.

A rather lengthy study of the whole matter resulted finally in a special design of fire-box, embodying the combustion chamber, brick wall with air inlets, and means for sparking the combustion chamber.

To check the theories in actual practise, an engine was changed by cutting off the entire back-head and building another with a fire-box the length of the brick wall plus that of the combustion chamber longer than it ordinarily would have been. The combustion chamber was formed by building a brick wall on a cross-bearing. When completed the engine was placed in service this was over three years ago.

The flues applied at that time have never

given any trouble from leaking or stopping up, and although twice in the shop for tire turning, the engine is still running with the original flues, having made over eighty thousand miles. On the same division sister engines, as well as engines of equal power in the same service, fail to make an average of over twenty-six thousand to thirty-three thousand miles before the flues require safe-ending and resetting.

Another remarkable feature of the entire remarkable performance is the fact that the flues show no indication of plugging even though soft coal is burned.

The foreman boilermaker at the terminal out of which the engine runs makes the positive statement that this locomotive has never been reported to have a flue blown out.

The engine is attracting much attention at the present time. A continuation of this success may result in the establishment of new standards for fire-box design which will rank equal with the superheater and improved brick arch in the promotion of increased efficiency.

From the standpoint of the engineer and fireman, those actually charged with getting the big locomotive over the road, the new design leaves nothing to be desired. The delight of the fireman's heart is a "free steamer," and this the 1655 certainly is, because the total absence of flue and fire-box leaks, coupled with practical immunity from front end troubles, insures that this enviable condition will always be present.

The bugbear of the engineer all over is the answering of queries regarding engine failures, the majority of which result from leaky flues or plugged netting, with the accompanying loss of time, but in this case the 1655 has failed to get a place on the delay sheet since being placed in service, thus establishing another record. The greatest care has been used in keeping the various records, and there is no question in regard to the accuracy of the statements.

NO. 1655 OF THE CENTRAL OF GEORGIA RAILWAY, BUILT BY THE BALDWIN LOCOMOTIVE WORKS, EQUIPPED WITH A FIRE-BOX AREA BY WHICH SHE IS EXPECTED TO MAKE A RECORD IN FUEL ECONOMY

RUNS ON SKATES, IS STEERED BY A WHEEL, AND HAS NO DRIVERS.

LUMBER HOG JUST SKATES ALONG.

MILES from the railroads, the lumberjack with ax and saw, fells the trees that the mills convert into logs

These trees must be transported to railroads before they can be put to any use. In the summer, if the forests are not too far in the northland, rivers and streams are used to float millions of logs to points where they can be shipped without great inconvenience or delay; but when winter grips the waters, then other means of moving the lumber must be found.

One of the most expeditious means is a curious locomotive that runs on metal treads and runners resembling skates

The locomotive is constructed very much on the order of the usual logging-engine. It has no drivers.

The treads are constructed to undulate and adapt themselves to the irregularities of the surface of the ground. The weight of the locomotive creates the necessary adhesion, and the treads moving slowly ahead, force the locomotive along on the skatelike devices in front. The engine is guided by a steering-gear quite like that of the automobile, and while the engineer is driving the "helmsman," as he is called, occupies the seat in front of the boiler-head and directs its course. It must seem strange indeed for these railroaders of the logging camps to operate their trackless roads without board, light or order.

A device of a very similar nature was constructed for the British army a few years ago. After the Boer War, when England suddenly realized how unprepared she had been for war, the anxiety to have the military fully prepared for a subsequent struggle was widespread throughout the empire

English soldiers had suffered much owing to the mountainous nature of the Transvaal Much difficulty was experienced in hauling artillery over the steep ascents. To prevent, if possible, a recurrence of this trouble, an automobile intended to climb heavy grades and move cannon, was built. This grade-climbing auto was propelled by the same sort of metal undulating treads that are used on the skating engine.

HOW TIME IS MADE.

Why It Is Necessary to Have a Fictitious Sun, Fundamental Stars, Gigantic Telescopes, and a Clock in a Tomb to Tell When It Is Noon Every Day.

BY C. H. CLAUDY.

"SEVEN minutes late, Jim," said the engineer of the express. "Got to make it up between Longport and Springhaven. See that she has all she'll stand."

Jim dropped his shovel long enough to pull out his watch.

"I make it seven and ten," he replied. "Bet you a cigar you're wrong."

"Be the first time the old ticker ever varied more than a second a month if I am," retorted the engineer, shutting off a little for a curve.

A very ordinary, unexciting, commonplace bit of conversation. But just what does it really mean, beyond the actual facts? What *are* seven minutes—seven minutes and ten seconds? What does Jim mean when he accused the engineer's watch of being wrong? What is this matter of time: how is it made: who makes it?

We get up, go to bed, eat, drink, marry, and transact business by the position of two hands on a dial.

What "Time" Means.

We run trains on a schedule of printed figures which are carried out by keen-faced men in engine cabs by the aid of two hands on a dial.

As passengers, we put our lives and our faith on the accuracy of the little ticker in the engineer's pocket, confident that if he has been ordered to meet and pass a train at a certain time he will do it or know that he can't do it—because two hands on a dial will tell him so.

The philosopher will give you more definitions of the word "time" than you can master in a month. But to the man in the street or the man on the cars, to the men in the cab and that other man who, with one eye on a train-sheet and the other on a clock, rules the destiny of dozens of moving trains by the pressure of his hand on a telegraph key, "time" does not mean an abstruse proposition in philosophy or a quibble of words.

Cannot Keep Time by Sun.

It means that No. 73 must be at Buffalo at fourteen minutes past nine in the morning or the Western mail will be late! It means that the difference in time between New York and Chicago must be considered in making up a time-table, and that an impatient public must be educated to the difference between twenty-two hours from New York to Chicago and twenty-four hours from Chicago to New York.

From the very earliest beginnings of civilization, the one measure of time common to all people and to all nations has been the day, and, later, the year.

Our whole fabric of civilization is woven about the fact that the earth turns over once in a certain time which we have arbitrarily divided into twenty-four divisions called hours. But the time which served our forefathers no longer serves us—nor could serve us if we tried to use it.

The beginning of our time measurement is noon—that instant in time when,

at any place, the sun is *directly* and *exactly* overhead.

It is the time shown by the sun dial which gave the earliest measurement of time intervals less than the day.

The "day" which our forefathers divided into twenty-four hours is supposed to be the interval between noon and noon. As the sun can never be directly overhead on more than one meridian at a time, it is obvious that noon occurs at different times on all different meridians.

But with trains and watches and telescopes and real time determination, chaos came from this simple beginning. Not only was "noon" later in one place than another, but the days were not all the same length!

Sometimes they were short and sometimes they were long a few minutes!

Of course, if such days were divided into twenty-four hours, sometimes the hours and minutes would be longer than at other times!

"Try the stars," said an astronomer.

But the time between the passing or "transits" of the same star over the meridian of any place is different by four minutes in the day from the sun's transit over the same place—a difference that amounts to one whole day in a year.

The reason is not difficult to explain: we go *around* the sun as well as around our own axis, but we measure star transits always from an object infinitely distant.

There is a point in the heavens called the vernal equinox. It is where the equator crosses the elliptic. When that point passes across our meridian, we call it astronomical or sidereal noon.

But as this sidereal "noon" occurs at all hours of the day and night, it would not be very satisfactory for daily use. We could not use it for trains and meals and business.

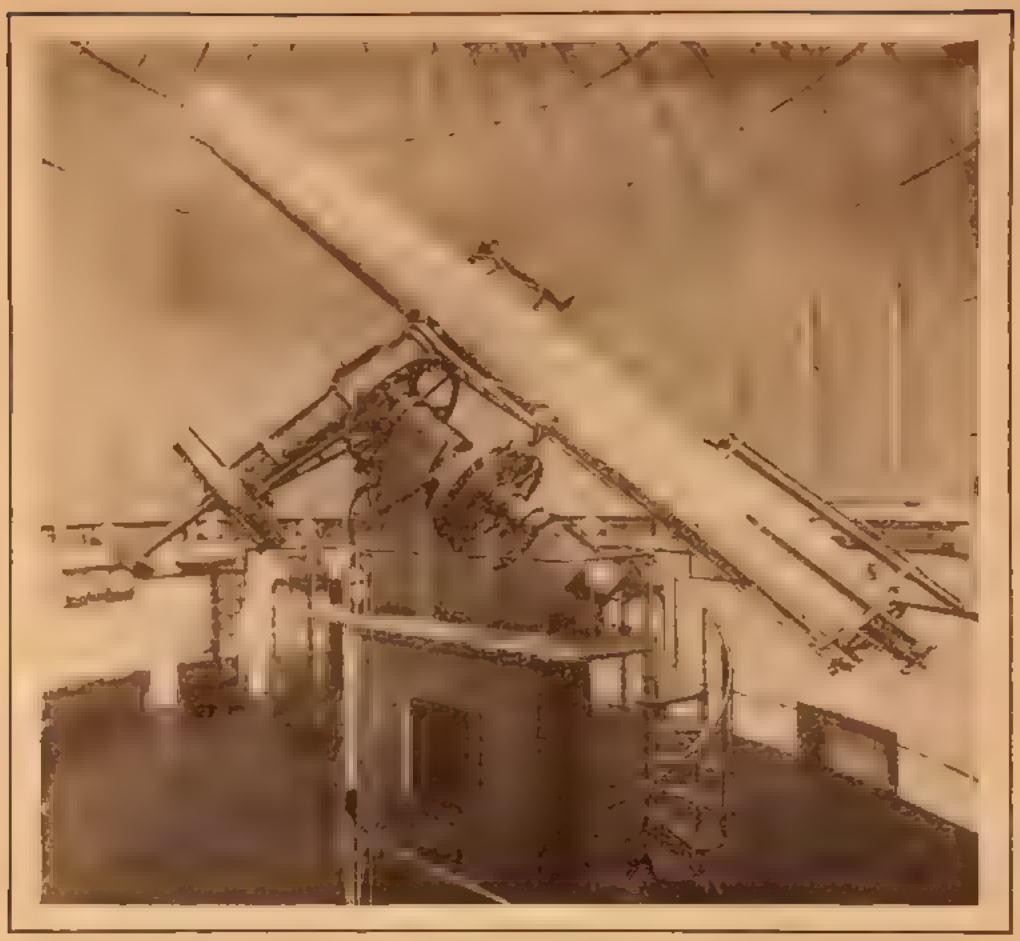
THE STANDARD CLOCK OF THE UNITED STATES. IT IS KEPT IN AN AIR TIGHT CASE IN AN UNDERGROUND VAULT AT WASHINGTON AND IS ELECTRICALLY WOUND EVERY THIRTY SECONDS.

Imagine a Sun.

Now, if we cannot keep time by the sun, because owing to our motion around it, actual sun days are irregular in length, and the accurate sidereal day, measured between transits of the same star, will not do because it brings noon or the starting point at all sorts of impossible hours at different times of the year, what are we to do?

It was quite a puzzle until some one thought of a make-believe sun. Very simple—like the Columbus egg trick.

We imagine a fictitious sun,



TWENTY SIX INCH REFRACTOR USED AT THE UNITED STATES NAVAL OBSERVATORY, WASHINGTON. IT BRINGS THE TRUE TIME FROM THE STARS TO THE EARTH.

or "mean" sun, as it is called, which has the same apparent *yearly* motion as our real sun, but which has an even and well-regulated movement, giving us days and nights which are all the same length and hours and minutes which never vary

You can see how easy this was to accomplish when all we had to do was to imagine it!

The difference between "mean solar time" or the time of the fictitious sun, and "apparent solar time" or the time by the actual sun, is never greater than fifteen minutes, so that we really are living by the sun and not by a figment of the imagination.

But those fifteen minutes would cause the greatest kind of confusion if they were not taken care of and obliterated from our time measurements. For instance, no watch which could be made would run correctly if we did not have our well-regulated fictitious sun by which to run it.

This fictitious sun served us very well until rapid transportation came into being. It did not make much difference to the man who traveled by stage-coach from St. Louis to Washington, District of Columbia, if, on arriving at Washington, he had to set his watch ahead an hour and a half

It made no difference that every town and hamlet had a different time from its neighbors—the difference was small and time was not of much value, anyway, when it came down to minutes.

But when trains began to run across the country at high speed, the time system, even with the fictitious sun, became unendurable.

Even the practise of carrying the time of large and important cities into the smaller towns and hamlets, within their

sphere of influence, resulted in confusion.

Thus, should Albany take its time from Rochester or from Boston? Or should it insist on a time of its own? Should a railway train have to run three schedules in a day or one schedule?

In a very short time, with rival railway systems, each running on its own time, confusion became worse confounded. A city would have mean time, railway time, solar time, or local time; and, perhaps, a rival railway or two operating on the local time of some other city.

Twenty-Four Standard Time Meridians.

When you said you were going away at twelve o'clock, it might mean eleven by your friend's watch and twelve-twenty-five by the clock on the city hall!

Some sort of order had to be brought out of the confusion, and so, in 1884, an international conference was called in Washington, where the present standard time-system was adopted.

In this system there are twenty-four standard time meridians extending around the globe, each exactly one hour different in time from the next one.

Each meridian, therefore, is the center of a time zone. The inhabitants of that time zone soon came to use zone time instead of local time, the maximum difference of which is half an hour, and instead of having many different times on which trains are run, we have only standard time-with certain definite places at which to set our watches.

As every railroad man knows, there are in the United States four of these zones, Eastern, Central, Mountain, and Pacific. In each, as we travel west, the time is exactly one hour earlier than it is in the zone immediately east.

It probably will be a great surprise to the man who prides himself on his watch and its accuracy, to be told that no watch, clock, or mechanism for the measurement of time, which has ever been made, really keeps true time.

No watch that is made, be the care taken in its manufacture ever so accurate; no clock, no matter how constructed or what elaborate precaution is taken to prevent its fluctuating in its movement, will keep true time with the stars or with the sun, fictitious or real.

So the first thing to do in determining actual time is to determine the "error of the clock." For though no clock made will beat in absolute unison with the earth in its accurate and never varying speed or revolution about its axis, fine clocks and watches *do* keep time with *themselves* to a very remarkable degree of accuracy.

If we know the variation they make with the earth, we can easily know the true time.

The standard clock of the United States—as fine a clock, possibly, as can be made—is in an underground vault at the United States Naval Observatory at Washington, District of Columbia.

It is kept at a constant temperature. It is in a glass case from which the air is exhausted below the point of least possible atmospheric pressure, so that no changes in the barometer may affect its running.

It is wound every thirty seconds electrically. It is run by a very small weight, because heavy weights and long intervals between windings have been found to cause errors in a clock's running.

This clock is the acme of simplicity in its mechanism. It was built absolutely regardless of expense, and yet—it doesn't keep time with the earth and the stars!

A constant comparison goes on at the Naval Observatory to determine the "rate" of the clock's "error," and, from that rate, to determine the true time.

Not Easy to Find Exact Time.

This comparison is accomplished by continual observations of both sun and stars through an instrument called a meridional circle. It is, essentially, a telescope, so mounted that its axis points to the true east and west, which can, therefore, swing only in a north and south line.

Many years of observation and much carefully gathered, corrected, and checked up data has enabled astronomers to know to the fraction of a second just when any one of certain stars, termed "fundamental stars," will cross the meridian at any given place.

If, now, the actual clock time at which the certain fundamental star does cross

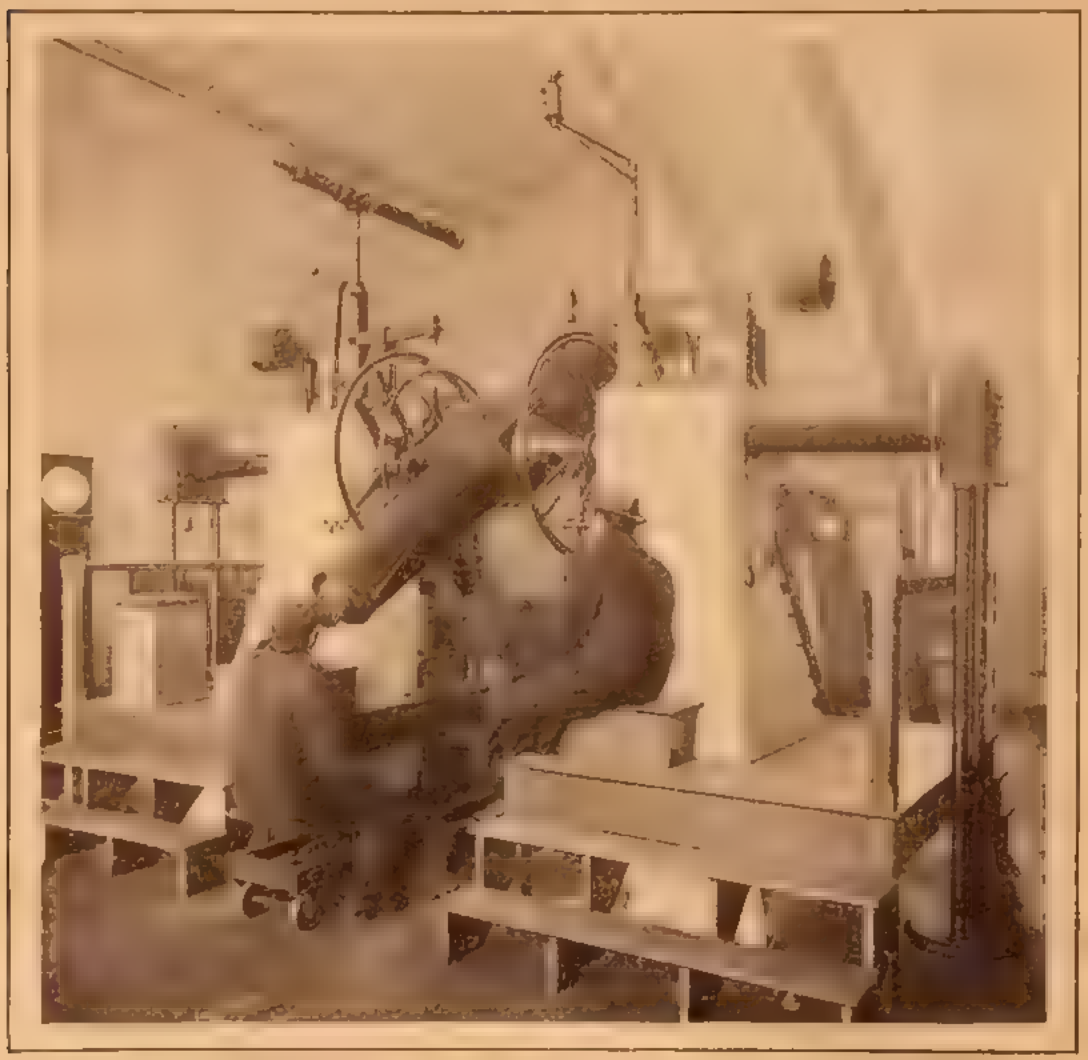
that certain meridian be noted, the *difference* between the clock time and the previously ascertained time will be the error of the clock.

The actual determination of time is not as simple as it sounds. Accurate time is either right or it is not right. There must be no loopholes for errors.

No sick potentate receives more care than the time-determining, meridian-circle instrument which is coddled and looked after with most tender care.

It is protected from dust and jar and heat and motion. The men who use it are never satisfied that it is correctly mounted, though it rests on huge stone piers and its machine work is the finest manufactured.

Its position is constantly being read through no less than four microscopes on a silver scale so finely divided that the human eye cannot see the divisions.



MAKING A NOON OBSERVATION WITH THE MERIDIAN CIRCLE INSTRUMENT. THREE MEN ARE REQUIRED. THE OBSERVER WHO RECORDS THE TRANSIT OF THE SUN ACROSS THE CROSS HAIRS IN THE EYE-PIECE OF THE TELESCOPE, A MICRO[illegible] READER WHO OBSERVES THE DECLINATION THROUGH FOUR MICROSCOPES AND A RECORDER WHO NOTES THE POSITIONS WHEN READ.

Every now and then the whole instrument is reversed and its true north and south positions assured by looking into "collimators" which possess "artificial stars" and by looking at basins of mercury or artificial horizons. "Mathe-

matical wakes" are held over its innocent corpse all the time.

The result is that all the mechanical, pressure, and temperature errors are allowed for. The instrument is absolutely accurate, so far as human ingenuity can make it, and where it fails, its failure is known and can be eliminated in calculations.

But still the troubles of the time determiners are not over, for there remains the personal equation to be taken into account—the "rate" or "error" of the human machine.

Always a Fraction Wrong.

Just as no clock can be made which keeps perfect time with the earth, so no human being has ever been found who could observe the transit of a star across the cross hairs in the eye-piece of a telescope and record his observation at the same time he sees them.

He *thinks* he presses the telegraph-key at the instant the star touches the cross hair, but he doesn't. He presses the key a fraction of a second too late, more rarely, too soon.

There are several hairs in the eye-pieces, across which the "fundamental" star is made to transit. For every such crossing the observer touches his telegraph-key, which is connected to a recording clock or chronograph.

While he is always a fraction of a second wrong in his signals, he usually has a constant "rate" or "error," like a clock. If he is in the habit of touching his telegraph-key 0.2 of a second after the star really transits across the cross hairs in the telescope, he will usually have the same error on all days and for all the transits. In other words, for a practised observer, the personal equation error is fairly constant.

As observations for time determination are made at Washington every day the sun shines, and many observations are made every clear night on "fundamental stars" for the same purpose, and as many observers make these observations and the mean or average of a great number are constantly being used to determine the error of the clock, it can be imagined that we know the actual true time for the meridian of Washington within a very tiny fraction of a second.

The transit instrument, or meridian-circle telescope as used at the Naval Observatory, is thus the means of bringing star time or true time to the earth. But it is not by any means the only instrument so used.

The great equatorial instrument, the twenty-six-inch glass telescope which made history in astronomy when the moons of Mars were discovered through it, plays an important part in securing the data regarding "fundamental stars."

Indeed, all the great equatorial telescopes the world over play their part in this work—the Lick, the Yerkes, the Observatory at Greenwich—the first and most important time meridian in the world—and those at Pulkowa and Potsdam. All are used from time to time in measuring the angles between stars, determining their positions, and, consequently, their times of transit.

These huge pieces of mechanism, weighing a hundred pounds where the transit weighs one, generate internal strains by the suspension of so heavy a mass from a central support. These strains are entirely too great to permit the instrument to be used for transit work with any degree of accuracy.

But if not accurate in measuring angles between star and earth, they have quite a remarkable and deadly accuracy when it comes to measuring the angle between star and star, for then the strain and stress are the same for both measurements.

These huge instruments, of which the Naval Observatory has two—one a twelve-inch, the other the enormous twenty-six-inch refractor—play an important part in time determination, although a secondary one.

Operators on Moving Floors.

On their precision of making and of using, on the accuracy with which the clock mechanism drives them west as fast as the earth turns east; on their utter exactitude depends much of the accuracy of fundamental star determination; on which, in turn, depends in some measure the accuracy of the determination of the difference between twelve o'clock by the clock and twelve o'clock by the stars.

One of the reasons why these instru-

ments are so carefully made and so elaborately fitted with an elevating floor that moves the observer up and down so that he may be comfortable instead of perching on a ladder to "see"; with electric lights and electric motors to move it and dozens of screws, handles, small telescopes, microscopes, eye-pieces, and fast and slow motions, until the great telescope is almost as complicated and far more exact in construction than a locomotive—one of the reasons for all this elaboration is this same fundamental star determination, on which depends in no small measure the even and accurate running of the "time of day."

What Happens at Noon.

But to have the true time from a calculation and a clock sealed up in a seldom or never visited vault underground in Washington, is one thing. Getting that time to the man in the engine cab—getting it to the men in all the engine cabs all over the United States and to the despatcher and the business men and the city clocks and the clock in the bank and the kitchen clock and the small boy's first watch, and seeing well to it that they all get the *same* time—that is a very important undertaking.

Up-stairs in the time-service rooms of the observatory are several more accurately made clocks. They are electrically connected with the clock in the vault, so that even if they run fast or slow the electric current continually sets them right with the standard clock.

Two of these clocks—two, so that if one breaks down there will still be one in service—are electrically connected with the main wires of the Western Union and Postal Telegraph lines.

Just previous to noon, Eastern time, all the usual telegraph business is shunted to one side and the lines left clear for the time signals.

At five minutes of twelve, Eastern time; five minutes of eleven, Central time; five minutes of ten, Mountain time, and five minutes of nine, Pacific time, the sounders in all these main-line telegraph-offices commence to beat seconds: "tick — tick — tick — tick," as the two clocks in the time-service rooms make the connections.

At five seconds of the minute, the sounders are silent and the first "tick" after the silence is the first second of the new minute. At ten seconds of actual noon, Eastern time, the sounders stop beating and are silent for those ten seconds. Then, on the exact second of noon they all chatter hard—a long roll.

Noon has arrived. The "mean sun" is directly over the meridian of Washington.

The clocks in all the telegraph-offices, electrically connected, get their time from these signals. Jewelers have clocks electrically connected with the telegraph companies' clocks. So have many hotels. So have stations and train-sheds and despatchers' offices.

The man in the cab sets his watch by one of these clocks. The man in the street sets his watch by the jeweler's clock. The tiny point of light we call a star, passing across a wire under the eyes of a trained observer, has regulated at exactly what time the engineer of the express will pull out.

And so, when the engineer says he is seven minutes late and has to make it up between Longport and Springhaven, and his fireman bets him a cigar he is ten seconds wrong, they both look at the first electrically connected clock to find out. Whichever loses the cigar, does so with, perhaps, an anathema for his watch but with perfect faith that the "right time" is the time of the clock.

The Best Timekeeper.

The anathema is an injustice. If the standard clock will not keep time in a vault protected from temperature and pressure fluctuations and without any interference from jars or vibrations, it is not to be wondered at that the railroad man's watch, no matter how well made, will occasionally vary from the path of rectitude and true star time.

The only thing which never varies from true star time is the earth itself.

But the earth does not keep *absolute* time because of a strange thing called "procession of the equinoxes," by which our seasons are slowly, slowly changing, and in the faint, proper motions of the stars there is a *very slight* variation between mathematical, absolute time and sidereal or star time which amounts to one day in twenty-six thousand years.

The Old Man of the Desert.

BY ROY O'TOOLE.

After Two Years at Cactus Siding, Jack Lowden Entertains a Picturesque Stranger.

THE telegraph-operator at Cactus Siding sat in the economical shadow cast by the 'dobe shack which served as a station, and soaked up the humid heat from the surrounding sands. All about him, as far as the eye could reach, waving billows of white intermingled with the occasional green of the cactus, greeted his vision until the monotonous landscape was lost in the misty heat waves rising from the desert.

High up toward the cerulean blue a vulture circled lazily, but the hum of insect life, which rules when vegetation adorns the wilds, was absent. The stern, palpable silence of the desert reigned supreme, and so it had been for days and weeks and months.

Jack Lowden had been the lone inhabitant of Cactus Siding for nearly two years, with the exception of a short vacation taken the summer previous, and the solitude of the desert had not failed to leave its mark upon him.

Train-crews stopping infrequently for water or orders at the siding, remarked his growing indisposition to exchange even passing pleasantries. His speech was halting and his manner almost forbidding.

"He's forgettin' how to talk," said Conductor Johnson one day. "He'll be gettin' dotty pretty soon if he don't ask for a change of venue. They can't any of them buck the desert very long and get away with it."

As it happened, a few days later, Johnson's train was obliged to wait at the siding for the west-bound passenger, and the conductor dropped off at the station and greeted the operator cheerfully:

"Hello, Jack!" he said, "'bout time for your summer vacation, ain't it?"

"Not this year," wearily replied that somber-looking individual. "I'm going to fight it out here until October, then I'll have enough in the bank-roll to buy that cottage back in Ohio that I've been telling you about. It'll be me for God's country and the green fields after that."

"So Myrtle is still waiting for you, is she Jack?"

"If she wasn't, this hole wouldn't hold me a minute. Her letters and my dreams of that vine-covered home of the future are all that's kept me in my right mind out here and, at that, I think I feel myself slipping sometimes."

"When you begin to lose your grip on things, it's time to go, boy," said the conductor warningly. "I've seen 'em stay too long out here."

"I'll stick until October," said Jack, waving his hand listlessly as the conductor climbed aboard the caboose and signaled to proceed.

After reporting the trains, Jack indifferently set about preparing a lunch from his store of canned goods. Cans were in evidence everywhere, canned corned beef, canned sardines, condensed milk—everything in cans, and the thousands of empty cans scattered about and partly visible in the sand of the desert gave an illuminating idea of the perpetual bill of fare at Cactus Siding.

Jack Lowden, however, in his desperate loneliness, had hit upon a scheme to enliven the miserable and irregular meal-

hours and rob them to some extent of their monotony.

Chairs and tin dishes were placed on the rickety table to accommodate two, and Jack, after sitting down at the banquet board, religiously served the plate in front of the empty chair before helping himself.

"Have some chicken, Myrtle dear," he said tenderly, as he served the corned beef. "And a taste of this brook trout," as he selected a couple of fat sardines and placed them beside the corned beef —and so he continued throughout the meal.

It was a harmless little deceit he was practising on himself when he imagined that Myrtle was partaking of his unlovely bill of fare.

"Foolish," he muttered, "but it helps some."

Then he wrote and told her all about her place at the table.

He received a loving, tear-stained letter in reply.

"You dear, lonesome boy," she wrote, "my heart aches for you in that awful place. Why can't you come back at once, even if we do have to wait a while longer for our home. I am so unhappy thinking of you out there on that miserable desert that my heart is almost broken."

The temptation to fly from the nauseating monotony and discomforts of Cactus Siding to the green fields of Ohio and the waiting arms of his boyhood's sweetheart was strong; but he shut his teeth firmly and put the alluring desire from his thoughts.

"It'd be like throwing up the sponge before the fight was over," he said. "I'd be a rank quitter to drop out now."

So he continued to hang on, counting the days and accumulating a bank-roll in hopeful anticipation, hearing frequently and cheerfully from Myrtle but, nevertheless, paying unconsciously the toll of the desert and solitude.

The despatcher at Vigo was enjoying the fragrance of an excellent Havana and gazing idly at his almost empty train sheet

"Sure 'tis quiet along the pike tonight," he confided to the chief. "Nothing on the division but a couple of drags. I'll get mine pretty easy for one shift, if it never happens again."

The chief grinned amiably.

"Pretty soft for you fellows out here. Nothing to do but smoke good cigars and sign pay-checks," he said. "How's that fellow Lowden getting along at Cactus? Will he want a vacation this summer, to go back east and see his girl?"

"Don't think so," replied the despatcher. "I'll ask him."

Reaching to the key, he languidly repeated the office-call for Cactus a number of times, but got no reply. Later he tried again and was more successful.

"What's the excitement down there to-night?" he asked jocularly, as Cactus answered. "You don't seem to have time to answer the wire. Must be a political meeting or circus in town!"

"Nothing like that," replied Lowden. "I'm entertaining a visitor."

"Cactus always was quite a social center," replied the despatcher. "Who is the distinguished party; some bo who fell off the freight?"

"He hasn't presented his card yet, so I don't know. He called this evening while I was taking my constitutional. I found him sitting here in the dark when I came back; but he's not a bo, he's a prospector and has located a rich placer diggin's somewhere near here. He's camping at the spring."

"Spring," ejaculated the despatcher. "There's no spring nearer Cactus than Alkali Basin, and that's forty miles north as the crow flies. He's not camping there and visiting at Cactus?"

The metallic sounder was silent for a moment and then Lowden replied:

"He says it's about three miles south, just over the big sand ridge. He's going to show it to me to-morrow. He needs a partner, and I think I'll sign up with him."

"Bully for you," replied the despatcher. "I suppose you'll go back east to see Myrtle in a special train this trip, eh?"

"Can't tell," answered Lowden. "The old man says there's oceans of free gold out there. If that's right, a special won't be any too good for me. I'll tell you all about it to-morrow night."

"I wish you would," replied the despatcher, "and if you need any more partners in the firm, let me know. I'm ready to quit railroading at a moment's notice."

"All right," answered Lowden — and the subject was dropped for the night as far as the wire was concerned.

As the desert is known to contain many rich placer deposits, the news of Lowden's visitor at Cactus spread rapidly about Vigo. Speculation was aroused as to the probable area of the deposit. Interest in the matter grew hourly, and early next morning Lowden was eagerly interrogated on the wire for information, not only by the despatcher's office at Vigo, but by the other telegraphers on the line. His replies to all, however, were extremely disappointing.

"The old man pulled his freight while I was asleep," he told them, "and I haven't been able to figure out which way he went. I turned the bunk-room over to him last night and this morning it was empty and the bunk didn't look like anybody had slept in it. I guess he didn't turn in at all, just drifted after I went to sleep."

That evening, however, interest was again awakened when Lowden called the despatcher on the wire and informed him that his visitor of the night before had returned.

"Found him here in the dark, same's I did last night," said Lowden, but he brought a sack of gold with him this trip. It's the real yellow, all right."

"You're a lucky boy, Jack," assured the despatcher. "Where'd he go last night?"

"Back to camp, I suppose. I didn't ask him. He's not strong on conversation, and as I'm only the junior partner in the firm, I'm not asking too many questions. He looks like he'd rile easy."

"Handle him with gloves, by all means, Jack," advised the despatcher. "Jolly him along, but don't let him get away from you again like he did last night."

"Looks like he thinks I'm trying to get away from him," replied the operator. "He's sitting across the table and hasn't said a word nor taken his eyes off me for thirty minutes, and I'm beginning to get nervous. He's got a snaky pair of lamps."

"Don't let a little thing like that worry you," said the despatcher. "You're just a trifle excited over that sack of gold dust. I'd feel nervous, too, if I were in your shoes, but it wouldn't be about his lamps, it'd be from wondering how many double eagles I was going to get out of the sand."

"You're right," answered Lowden. "I haven't any kick coming because he's sizing me up, but I do wish he'd look at something else for a change. He must have my mug pretty well photographed on his memory by this time."

The trains moving over the division demanded the despatcher's attention at this point, and it was some hours later before he found time to inquire further into the situation at Cactus. Again he was obliged to call that station some little time before he received any response.

"What'd you wake me up for?" complained Lowden. "I was pounding my ear something scandalous."

"Hope your visitor is sleeping comfortably, too," said the despatcher. "It was because I was worried about him that I called you. Is he camping with you to-night?"

"Sure," replied Lowden. "He's in the bunk-room; that's why I'm sleeping on the table."

"Nothing like hospitality, Jack. Sure he ain't walking in his sleep again to-night?"

"I'll just look and see.

"Well, I'll be darned," came over the wire a moment later, "if the old goat hasn't flew the coop again, gold dust and all. The sack was laying on the chair when I went to sleep. Ain't he the limit?"

"He certainly is," agreed the despatcher, "but you're not much better. You'll let that gold mine get away from you if you don't stay awake until you find out where it is."

"If he shows up again, there won't be any more naps for me until I trail him to the spring," declared Lowden. "I've written Myrtle all about that gold mine and I must find it now."

The next day Conductor Johnson was obliged to make another stop at the siding. Having heard of Jack's prospector friend through the rumors about Vigo, he dropped off at the office to get some first-hand information.

"Hear you're a mine-owner now, Jack," he began by way of introduction.

Jack smiled glumly. "I am and I ain't, Bill," he said. "I got a kind of a vanishing partner, and it's pretty hard to

tell where I'm at. Don't know whether he's suspicious of me or what, but he don't stick around long enough for me to get that mine located."

Jack looked about uneasily, as if he expected his vanishing partner to arise out of the sand of the desert.

"I've heard a good deal about the matter in Vigo," said Johnson, "and the old man's story don't hold much water with me. There's no spring nearer here than Alkali Basin, unless it's broke loose in the last couple of years. It's my own private opinion that the old man is expecting to get his free gold off No. 42 to-night. There's a rumor on the pike that she'll carry a whole car-load of it from the Frisco mint. I got your friend sized for a hold-up man."

"By thunder! You may be right, Johnson," exclaimed the operator. "That'd explain his mysterious actions, though I don't see how he'd get away with it. It's sixty miles to the mountains, and that's some walk on the desert."

"You don't know what he's got behind the sand ridge. There may be half a dozen of 'em over there with horses, guns, and all the rest of it. If he shows up to-night, give him the glad hand, but tell the despatcher to have 42 prepared for a hold-up at Cactus."

"Sure, I'll do that," replied the operator. "It won't do any harm, though I hope it don't turn out that way. I'd hate to give up my dreams of that gold-mine."

"It don't look reasonable to me," said Johnson, "that if he did have a rich prospect out there, he'd be in much of a hurry to call in a partner and give him half. Sounds pretty fishy."

"Guess you're right about that," agreed the operator. "He's either nutty or else that free-gold story is a stall. I'll watch him pretty close if he shows up to-night."

Having implanted the hold-up idea firmly in Lowden's mind, Johnson climbed aboard the caboose, and the long string of alkali-covered box cars resumed their dusty journey.

That evening the despatcher at Vigo, busily engaged in putting out train-orders, disentangling complications arising from hot-boxes and other unexpected delays to nearly every train on the division, snorted profanely when Cactus broke in on the wire and feverishly took the circuit.

"What's broke loose down there?" he asked angrily. "Can't you let me get the 'red ball' out of the hole before you chip in?"

"Stop 42 at Rawley," continued the metallic voice from Cactus in the same feverish manner. "There's a hold-up man here. He made me set the signal red and then chased me into the bunk-room. He didn't know I had an instrument in here."

"How many of them are there?" asked the despatcher.

"One is all I've seen so far, but he's got guns enough to do the job all by himself. He's a regular walking arsenal. There may be others outside."

"It's too late to stop 42 at Rawley; they left there ten minutes ago. Is there any obstruction on the track?"

"Don't know. Say," continued Lowden, "he's listening right at the door. Think he's heard me pounding this key. He's opening the door and coming in—"

The wire remained open a few seconds. Then came a string of unintelligible dots—then silence.

"Looks like he's done for Lowden," said the chief who had been standing by. "Order out a special and give them right over 42 to Tinhorn. We'll load it up with rangers. If Lowden's been murdered, we'll make it hot for whoever did the job."

The call-boy was hurried out to find a crew for the special, while the round-house was ordered to have an engine on the main line inside of thirty minutes.

Two coaches were switched to the depot platform, and as the rumor of the hold-up circulated about town, the grim, stern-faced, armed rangers of the desert brigade made their appearance and took their places inside the waiting coaches.

On the siding below the depot a box car stood at the stock pen. Saddled horses were loaded rapidly into it with such supplies as were needed for a desert campaign.

In a remarkably short space of time the special hurried out into the dreary waste on its mission of vengeance.

In the mean time No. 42 approached Cactus. The engineer seeing the red signal out, grunted dismally:

"Too bad he couldn't put his orders out at a regular stop instead of holding us up at the jumping-off place of the whole system."

The conductor hurried to the telegraph-office to learn the cause of the unexpected delay to his train. As he entered, a curious spectacle confronted him. Jack Lowden stood in the doorway of the bunk-room, his hands high above his head and his gaze riveted intently on the empty chair at the telegraph-table.

"Look out!" he screamed as the conductor entered. "Look out! Don't you see he's going to shoot!"

Slowly his upraised hands clasped his temple, and he dropped in a senseless heap.

The conductor, thoroughly alarmed, despatched the brakeman through the coaches in search of medical assistance. When the shack returned a few moments later, fortunately with one of the company's physicians, Lowden sat propped against the wall talking wildly of hold-ups, free gold, and Myrtle.

"How long's he been out here?" asked the physician.

"Couple of years that I know of," replied the conductor, explaining the tableau he saw when he came into the office.

"Humph, no wonder he's been seeing things if he's been here that long. Carry him into the Pullman," tersely ordered the physician. "I'll get his transportation to El Paso from Tinhorn."

A partly written letter to Myrtle which lay on the telegraph-table furnished the physican with all the confirmation he needed for his statement that Lowden had been "seeing things." It read:

> My recent acquaintance who has been coming and going so mysteriously the last couple of evenings is, I fear, not a prospector at all, but will more likely prove to be a hold-up man with designs upon 42 to-night.

"I see," said the physician, turning to the conductor, "he's been having an imaginary visitor out here. 'The old man of the desert' they usually call him. Simply a hallucination produced by the desire for human companionship."

Some weary months later Jack became convalescent. Lounging upon the veranda of the El Paso hospital was now his daily pastime. Beside him usually sat a sweet-faced old lady—his mother—and a blooming girl of nineteen.

"Jack, dear," the girl said, "when I read that rambling letter from you telling about the old man coming to visit you, I knew that something was wrong, for even away back in Ohio we have heard of the 'old man of the desert,' and your mother and I were almost on the point of coming out here when she received the message that you were dangerously ill. Oh, Jack! Suppose you had followed him out on the desert to search for gold!"

She shuddered at the awful possibility.

"If what they say is true," replied Jack, "that's where he generally leads his victims—somewhere out in the sands to die of heat and thirst; but that hold-up idea of Johnson's kept me on the job and no doubt saved my life. I'd heard lots of tales about the old fellow before he came to see me, but never suspected his identity.

"I remember everything distinctly, his general appearance, weapons, and all up to the time I called the despatcher and told him of the hold-up I thought was coming off. Strange what realistic hallucinations one gets on the desert."

LONG JOURNEYS MADE BY PLOVERS.

BIRD migration has always been and is yet a thing of much mystery. Let the man who has never felt the thrill of this mystery take his atlas and turn to a map of the Western Hemisphere. Let him locate the Arctic Islands north of North America, say seventy-five degrees N. L., and with his pencil draw from there a line down along the coast of Labrador, across to Newfoundland, and down to Nova Scotia, then across the Atlantic to the lesser Antilles in the West Indies, from there to Brazil and across to Argentina, and finally halt his pencil in Patagonia. He will have traced then what is said to be the southward migration of the American plover. But let him continue the course, across to the Pacific, northward up the coast, then across Central America and up the Mississippi valley, through central Canada, and back to the northern islands. He will then have mapped what naturalists have given as the yearly itinerary of some of these wonderful birds—a journey of some fifteen thousand miles.—*Outing.*

THE TROPIC BOOMER.

Though Attractive at Long Range, the Facts Gathered By One Who Has Been There Prove that Railroading in Latin Countries Had Better Be Let Alone.

BY N. J. PATERSON.

RAILROAD men, particularly engineers and machinists, at some time in their careers become a prey to wanderlust. Those of the clan who may read this will appreciate this truth. With the majority it arises through the spirit of romance; with others the impulse is mercenary, no consideration being given to what is ahead, but with all none can dispute that the desire is dominant to follow their respective callings in some land other than their own.

Some years ago it was general. To-day it is a daily remark to overhear in any railroad terminal, provided local affairs fail to suit, "Oh, I'll jack the job up and go to Mexico."

Many did go, too, and not a few much further.

Travelers Hide the Truth.

Not only Mexico, but Cuba, South America, and even China and Japan, has each a full quota of disgruntled railroad employees from the United States. Nine of every ten would part with five years of their lives to be home again, after only five months' service in the promised land.

Now that the world has grown smaller it is certainly astonishing that such ignorance should prevail in regard to existing conditions in railroad work as is found in those countries. It is all the more remarkable that the pilgrim does not seek more definite information before "going out." It is a comparatively easy job to get out, but a mighty hard one to get back—as many of the tropical boomers will sorrowfully attest.

A possible explanation lies in the fact that very little that is practical has been written along these interesting lines, and because those who have gained practical experience through adventure are averse to telling the truth on their inevitable return.

They don't care to advertise how badly they were fooled.

For instance, in the spring of 1897 the railroads of Mexico were paying five and six dollars a day for roundhouse machinists.

Those who took the journey, unless well-informed on the currency of Mexico, were not aware of the fact that those dollars meant Mexican "dobies." When they reached Silao, on the Central, or some other point, they received five dollars as promised, but, at the rate of exchange then prevailing this sum amounted to about $2.45 gold.

As none of the men probably had been getting less than three dollars a day in this country, it did not take them long to realize that the change was not a financial benefit.

Roam for Experience.

There was no difference in the work either, and there is none to-day. A locomotive engine calls for the same daily attention, whether running on the Pennsylvania, the Transsiberian, or on the United Railways of the Argentine Re-

public, and this feature is even more conspicuous in Mexico on account of the exceedingly long divisions.

A majority of the boomer machinists in Mexico entertain the hope that they will some time get back to their own country. With this vision in view, they try to save a little money; but there is not much incentive toward this laudable effort in view of the omnipresent fact that two dollars of Mexican savings must be surrendered at the frontier for one dollar, American.

Nevertheless the "land of *manana*" has been and probably will remain as the Mecca for the boomer machinist. This may remain as a relic of the so-called "good old days," say twenty years ago, when it was customary for the newly graduated apprentice to roam for "experience."

Of course, he could have acquired valuable experience much nearer home; but he wouldn't be thought much of on his return unless he brought documents to prove that he had been employed by the National, the International, or the Central—preferably on all three.

Romance That Quickly Pales.

It is furthermost from my purpose to "knock" or say anything derogatory about the railroads of the tropics. They are well-equipped and operate under conditions peculiar to themselves. These conditions are very peculiar, however, and why American railroad men want to mix up with them furnished the inspiration of this article.

Frequently the question is asked around shops and railroad terminals by machinists and engineers out of work: "Would it be safe to go to Mexico on the chance of getting a job?"

The proper answer is, "Yes," unless the applicant has been guilty beyond forgiveness of some offense against discipline

Practical and competent men are in demand at all times. This applies in Mexico as well as here, so there is little doubt about getting a job. It has been my personal experience that if either an engineer or a machinist would present himself to the proper employing official and talk intelligently along those respective lines for about ten minutes, he would be taken on without further credentials.

Eliminating the charm of adventure, however, which quickly pales when you have no companion to share it with you, there is little inducement to go to the tropics. While not considering railroad officials, there is little doubt that quite a few of the rank and file have sought foreign service owing to grievous trouble at home.

They work abroad because they are obliged to earn their own living.

One of the most discouraging remarks I ever heard was made in my presence by James E. Gordon, a director of the American Society in Mexico.

"It only exists," he said, "to help you fellows get home and to give you hospital attention when down with the fever."

Lose Time Through Festivals.

While the pay is adequate to support a man in comfort provided he works steadily, and, in time, to even provide a competence should he decide to remain in Mexico indefinitely, there is still, as in the case of a machinist, much to operate against drawing a "full month."

A potent factor is the pretext seized upon at any time by the native help about the shops to take a day off. Opportunity often presents itself because there are nearly one hundred religious festivals in a year.

The observance of many of these is so general that the shops are practically tied up, and as little would be gained through retaining the comparatively few American machinists, they are obliged to lose their time until the natives see fit to return.

On the contrary, living expenses are reasonable. A man can live comfortably in Mexico City for $60 per month, silver, and as low as $35 in the country, but the prices charged for clothing, especially shoes and overalls, are ruinous. Five dollars is the lowest for a suit of overalls.

At the outlying points where the various railroads maintain restaurants for the accommodation of the traveling public, employees are allowed to eat three standard meals for one Mexican dollar a day, approximately fifty cents in

United States money. The food is bountifully supplied.

In the large cities a man must hustle for a restaurant within his means, or make some arrangement with a private family to secure board with meals.

Tools Very Costly.

Another item of expense in all tropical countries is the high cost of machinists' tools, although the only tools one can purchase are those manufactured in the United States.

The old saying, "A good mechanic can work without tools," cannot be literally accepted, because many operations to-day, especially machine-shop work, are much more complicated than in former years, and special tools are absolutely necessary to speedily and properly perform certain work.

We all remember that the kit of the old time boomer—if he had a kit—consisted of a two-foot rule, a pair of inside and outside calipers, a hook scriber and a center punch. These invaluable implements of the trade will not suffice today when one is traveling in foreign countries.

Mexican helpers are generally unprincipled. It is not uncommon when a machinist leaves his hammer on the floor while he walks around to the other side of the engine on which he is working, to find it missing on his return.

Few Natives Are Mechanics.

Native help does not receive exceptionally high pay. Some of the most capable get no more than $1.25 a day, so they probably feel that they must supplement their wages in some way. If the rightful owner ever recovers his property it will be found in a pawn-shop.

A visit to one of the pawn-shops with which the tropical cities abound, will disclose invariably a weird assortment of hammers, wrenches, calipers, try squares, straight edges and many of the higher-priced tools, such as combination squares, verniers, surface and depth gages, etc., the original owners of which foolishly imagined that they would be able to take into the tropics and bring them out again. If they were obliged to replace any of these in order to do their work, just about three times as much had to be paid for them in the tropics as in the United States and Canada.

Both the Mexican Central and the National for a long time have been experimenting with native labor, although it is a notorious fact that the average native simply detests a skilled trade. There is scarcely one in a thousand with an aptitude for mechanics.

This move on the part of the railroads arose from a realization of the fact that because of similar conditions they could not depend on American help staying with them after a sufficient "stake" had been accumulated, and that the only salvation in securing a permanent force was to begin the gradual education of the Mexican.

Small Chance to Climb.

Accordingly they start a boy on a lathe, planer or shaper, and there he stays all his life, not designated as a machinist but simply as a "lathe hand," "planer hand," or whatever it may be.

They do not possess the versatility to become "all-round hands," although in time many learn how to work acceptably as drill pressmen, grinders and bolt-cutters.

No American machinists are ever employed on such work. They are needed for the finer details in the erecting gang, the roundhouse, setting valves, hanging guides, and laying out work. The reason that it would be safe to go to Mexico, expecting to find a vacancy among these men, is because practically all of them want to leave at the first opportunity. I fully believe that within a few years all work in Mexican railroad shops, excepting the supervision, will be handled by natives.

It is well to state these facts plainly as they are based on personal observation while working in various capacities in that country. My only purpose is to correct the erroneous impression among the railroad men of this country who have not been employed as yet off their own road.

There are instances on record where American machinists have secured regular work in the tropics, married and settled down to stay, but they are very

rare. When the long rainy season comes, bringing into full prominence the dampness and the unsanitary condition of the dwelling-houses, the stoutest heart will sigh for the comforts which can only be found further north.

Rheumatism, fever, and the plague of various insects, all add their quota in intensifying the discomfort of the situation and the desire to make a "getaway."

Long Runs for Men.

On the road, of course, it is different, because the most apt native on earth could scarcely ever learn to run an engine and keep out of trouble. There are instances where the dubious experiment of setting them up as switch-engineers has been tried. This has worked after a fashion, but popular feeling is against it.

Practically all of the engineers and conductors are Americans, while the majority of the firemen and brakemen are natives.

The engineers get their positions by applying to the master mechanic of the division on which they desire work. If found acceptable they are placed on the extra board to await their turn for a regular train. Naturally the passenger runs are very few, and being held by the veterans in the service, it would be a long time before a new man could get such a run. A fair living, however, may be made in the freight end while on the extra list.

The runs are so very long that not many trips are necessary in a month to keep a man going. For instance, on the Central of Mexico, some years ago, the division for freight as well as passenger was from Silao to Mexico City, going south, 238 miles, and return to Silao, a total of 476 miles.

As one way over the division now requires 8 hours and 35 minutes for a passenger train, it can be imagined readily how many more hours would be put in on a freight.

Going north, the division extended from Silao to Calera, 220 miles and return, and it was required that an engineer should be competent to run over each division as might be necessary.

The unique condition thus developed that a man must learn over five hundred miles of main line. There is no parallel in this country, and probably not in the world, for such a stretch of territory in one man's head. This is somewhat compensated for, however, because much of it is straight away and plain sailing and the time not particularly fast.

One point should be made prominent in connection with all tropical railroading: an engineer should never accept a position without first writing to the master mechanic in order to learn the opportunities that exist, and to secure all possible information on the conditions governing the work.

After the deal is closed he should make a brief study of the legal aspect of his calling so far as it relates to placing responsibility for wrecks, and for injuries to fellow employees.

Some of these laws are rather peculiar, especially in Mexico, and often result in an extremely embarrassing predicament for the unfortunate who transgresses them.

The Mexican legislators have never accepted the fact that an engine while running is not always able to stop on a three-cent piece at an instant's notice. They believe that there is no excuse for even excusable accidents.

A story is told of one road which boasted that no one in its employ was ever arrested or imprisoned, as those who might be charged with the accident promptly disposed of the corpse. The usual procedure was to cremate the body, exceptional opportunity being presented by the fire-box.

Although the exaggerated yarns freely circulated in this country that the Mexican authorities demand the life of an engineer who runs over a native are only travelers' tales, the fact remains that the consequences are very unpleasant.

Long Imprisonment for Accident.

They have for an inevitable sequel a long term of imprisonment before the case is called to trial. Mexican justice moves slowly and Mexican jails are neither cleanly nor desirable places in which to reside indefinitely.

To illustrate how easy it is to get in trouble with the law the following incident might be cited:

The wreck train was called out about

seven o'clock one night, to go from Silao to Guaje, about forty miles, to replace a string of cars which were off the iron.

The train crew and the Mexican fireman were provided forthwith, and the caller was despatched for Engineer Riordan who happened to be "first out" on the extra board. Riordan was the only available man in town.

When the caller returned to the roundhouse he bore the "O. K." of the engineer on his book; but it soon became noticed that the engineer was a surprisingly long time showing up in view of the importance of the call. Finally, toward eight o'clock, the despatcher began burning up the wires with forceful inquiries as to why the wrecker hadn't started.

As there was no one qualified to take the train, the only logical procedure was to send a search-party after the tardy one, but he wasn't at home or in any of his haunts. After a prolonged inquiry he was located in the lock-up. It became necessary to awaken the mayor, who had retired early that evening, and, some say, to cross his palm in order to secure the order for the engineer's release.

Riordan had left his boarding-place promptly after signing the call-book, but in hurrying across the plaza toward the roundhouse he raised a policeman's lantern, which was resting in the center of the square, the better to observe his watch.

To touch this sacred lantern is equivalent, in the eyes of the law, to an assault on the officer himself. The officer usually reposes on a bench some little distance from his light, which is left in a prominent place to indicate that he is in the vicinity if wanted. Riordan was green, however, and the wreck train left some two hours late.

Jailed for Passing a Shrine.

Another curious illustration of the working of the law occurred some years ago on the Mexican, or "Queens Own," Railway which was first to connect the capital with the eastern seaport of Vera Cruz.

When this road was laid out the sentiment against railroads was quite strong because of the danger supposed to be associated with them. Even the more intelligent Mexicans could not be induced to abandon the idea that boarding a train as a passenger invited death. There was a local life-insurance concern in Puebla which stipulated the forfeiture of a policy if the holder rode not only on the Mexican but on any other railway.

A few wrecks complicated the situation, and, therefore, those natives compelled to become passengers through unavoidable circumstances resolved to travel through the instrumentality of divine grace. They erected along the line, every two miles, a stone shrine. It was agreed by the railroad company that the train should stop at any one of these shrines designated to the conductor, in order that the passengers might alight and offer up prayers, allowing them to reach the next shrine alive.

Engineer McElroy, who is now employed somewhere in the Pittsburgh district, was unaware of any such regulations. One morning he passed the sacred monolith at schedule speed. He spent many months in jail in consequence before the authorities became convinced that no sacrilege was intended.

Pay Suspended During Sickness.

All modern appliances for safeguarding trains are in evidence, but there are some tortuous divisions to run over. That portion of the Mexican railway known as the "mountain division," between Orizaba and Esperanza, has probably no parallel on earth for physical obstacles overcome by a broad-gage line.

On this stretch of forty miles may be encountered grades of four per cent and curves of less than 400 feet radius. In the vicinity of Maltrata it is possible to view the line of road on seven different terraces, and the same natives who sell the passengers their wares on the top of the mountain will meet the train five or six times more by scrambling down the slopes while it is making a long détour.

This road was built by English capital. English methods prevail to a large extent, and the wages paid to both shopmen and engineers are correspondingly lower than those of the other Mexican lines. It is the most difficult road in that country for the American boomer.

Although Mexico is the principal field for railroad men seeking employment in strange lands, many of the South American roads have received their share of attention. One of these in particular is the Guayquil and Quito of Ecuador. Not very long ago it advertised for engineers, offering 385 sucres (about $185 per month in gold), with transportation out and after one year's service free return transportation home.

My personal observation leads me to offer this advice regarding the G. & Q., in two words: "Stay home."

While it is possible to make the promised $185, there is a reverse to the shield. That is the way the money goes. Meals are $50 to $60 per month; a room at the home terminal, $10 to $15 per month; a room at the other end, $1 per night; hospital service when sick or injured, $3 a day, during which period pay is suspended.

I also noticed that the railroad men recruited in the United States received their passage to Guayquil, but in nearly every instance the "return free fare" was evaded and it cost the luckless pilgrim $128 gold to again see his home.

On the mountain division of this railroad the grade is so stiff that 9,000 feet elevation is gained in 49 miles over curves as high as 29 degrees. The limit of train for a 112-ton engine with 13 x 26 inch cylinders, is only four 32,000-capacity cars. The road finally attains the modest elevation of 12,000 feet above sea-level.

The railways of Cuba, which once numbered in their ranks seventy per cent American engineers, have now scarcely ten per cent. It has been found that the British engineers are much better stayers, and the work is naturally falling to them whenever outside help becomes necessary. Furthermore, their employment is gradually establishing a scale of pay based on that of the roads of Great Britain.

All things considered, Cuba is the least desirable place for a man seeking foreign railroad employment.

Not only my own experience but that of many others will substantiate the fact that there is nothing to be gained and everything to be lost by a railroad man leaving this country. Any idea that your financial condition will be bettered is absolutely an error. Any expectation of possible promotion may as well be abandoned before starting.

A moment's reflection should convince any one that the most essential qualification toward this end would be a mastery of the Spanish language. The preponderance of native labor employed dictates that it shall be the tongue of the road. Without it, with the possible exception of the engineer, all foreigners are badly handicapped.

In the November number we will publish an article describing employment conditions in Panama.

THE SCOT AS A RAILROADER.

JAMES WATT, the celebrated improver of the steam engine, entertained a very low opinion of the mechanical ability of Scotsmen, but he was prejudiced without just cause. The impression was spread that Highlanders had no skill as artisans, although, in truth, their smiths were the best sword makers in the British Isles.

The story is told that Archibald, the blacksmith of the McPherson clan, committed a crime that caused the sheriff of Invernesshire to cause his arrest and intended hanging the sword maker. When Cluny McPherson heard of the outrage he went to the sheriff and offered to let him hang two weavers in place of the one smith, showing the estimation in which the smith was held.

Scotsmen have taken very kindly to railway life in America. In an address delivered before a Scotland society, Dr. Angus Sinclair said:

"The operative office of our railways numbers close on 21,000. Scots' names are fairly represented on this list, with 744 Macs, 81 Anderson, 68 Wilson, 60 Thompson, 52 Campbell, 41 Stuart and Stewarts, 39 Scott, 39 Walker, 37 Reed and Reid, 37 Mitchell, 31 Morrison, 29 Kennedy, 28 Ross, 26 Murray, 26 Turner, 25 Hamilton, 25 Ford, 22 Johnston, 22 Cook, 21 Gordon, 19 Simpson, 18 Robertson, 17 Crawford, 17 Burns, 17 Fraser, 16 Henderson, 16 Maxwell, 14 Cameron, 13 Buchanan, 13 Chambers, 13 Elliott, 12 Lindsay, 12 Leonard, 10 Grant, 5 Sinclair, 1 Carnegie, a total of 1,666.—*Railway and Locomotive Engineering.*

Who's Afraid?

BY

ORLANDO MOORE.

"BUNK!" exclaimed Pete. He propped his feet on top of a crate of chickens, tilted his chair back, and blew a cloud of smoke at the roof.

"Flapdoodle—and I can prove it. S'pose you was walkin' along through the woods, never thinkin' there was anything more dangerous around than a squirrel or rabbit, and a mountain lion dropped out of a tree. Do you guess he would't hurt you, just because you wasn't feelin' afraid?"

"That ain't the point," argued the baggageman, leaning forward and removing his pipe from his lips. "A feller would be afraid by the time the lion got onto him

"You see, if he didn't know the beast was there, he couldn't tell whether he was going to be afraid or not. But" with much emphasis and sufficient pause to lend weight to the conjunction—"if he knew the lion was in the tree and then wasn't afraid, why he could walk right along about his own business, and—"

"And the lion would land on him just the same," interrupted Pete.

"It would not. I say—"

"And I say it would, unless the feller looked it squarely in the eye. Of course, then he wouldn't be bothered. Nobody needn't worry about bein' hurt in that case. Toby, the hypnotic power of the human eye will quell any wild beast, and make it eat out of your hand. But it's all rot to say a mountain lion wouldn't maul a man up if he got a chance, whether the man was afraid of him or not. How'd the lion know? S'pose he'd stop to ask questions, eh?"

Toby snorted.

"You make me tired! The lion's instinct would tell him, of course, and he wouldn't touch the feller—wouldn't pay no attention to him at all.

"You got that about the 'hypnotic power of the human eye' out of a book. You never had brains enough to think it up by yourself. I know what I'm talkin' about, I do."

"Good thing you do; it's a cinch no one else would," observed Pete with gentle irony. "Now look here, Toby, it stands to reason you're wrong. Don't you know an animal-trainer doesn't dare turn his back while he's in a cage? He has to keep his eyes on the beasts all the time—has to cow them just by the power of his gaze."

"Don't that show I'm right?" cried Toby triumphantly. "He dassent turn his back because he's afraid! If he wasn't he could do anything he liked; but just because he's scared they'll jump him if he ain't watchin' 'em every minute, he keeps lookin' at 'em.

"I guess I've proved my case, Pete."

"Proved nothin'," contradicted Pete, snapping his fingers. "It just shows how much you know about it. Why, do you think—but no, you don't, or you wouldn't talk like a fool. I'd just like to see what you'd do if you was turned loose with that beast over there. I'll bet a hat you wouldn't turn your back, you jackass!"

He pointed in the direction of the heavily slatted crate within which crouched a long, tawny shape, with half-closed eyes and restless, uneasy movements.

The crate and its contents had come all the way from Chicago, under consignment to the Bronx Zoo. On the last hundred or so miles of the long journey, Pete and Toby, respectively messenger and baggageman on the combination baggage-and-express car, had fallen into a dispute over the big cat—a dispute which waxed more and more acrimonious as each man stubbornly expounded and defended his own theory, refusing to admit that the other's contention contained a single particle of reason.

Toby was almost speechless with rage. He found enough breath to air a few of his own opinions, and, in conclusion, delicately hinted that animals with long, fur-bearing ears were his particular specialty. He even repeated his conviction that in a personal encounter with one he would be victorious with one hand tied behind him.

Having discarded his coat, he faced the messenger, who lost no time in taking up an appropriate attitude. In another instant the car would have been the scene of a lively mix-up; but just then the train came to a halt at a way-station, and the voice of the conductor was heard outside shouting lustily for Toby and Pete.

Darting malignant glances at each other, they went through to the rear to obey the summons. For the next few minutes they were obliged to forget their differences, or at least postpone them, while they attended to their several duties.

Then the station-agent engaged both in conversation. It was not until the train was gathering speed beyond the station that they returned to the car, Toby laboring under the weight of a large suit-case which Pete had refused to touch, as it was checked through on a ticket and not consigned to the tender mercies of the express company.

Toby carried his burden well forward, and slammed it down with a resounding thud before turning about.

"Now, then," he said belligerently, "I'm walkin' through the pasture where the jackass is!"

The other needed no second challenge. With a whoop of anger, he sprang forward, his fists clenched, his eyes blazing. Toby squared off and waited for him, circling slowly and warily around in the confined space.

"I'll fix you for that!" Pete promised wrathfully. "Before I'm through with you I'll push your misfit mug through the back of your neck! Call me a jackass, will you? You— *Holy Moses! Look at that!*"

Not ten feet away, between the two men and the door, crouched the mountain lion, its long tail waving snakily, its yellow eyes glittering. Blood was dripping from its jaws, to the sides of which adhered a few feathers—one of the chickens had been overtaken by premature fate.

With a yell Toby abandoned his contemplated chastisement of Pete and leaped for the top of the now empty crate. He landed with a crash and hastily drew up his feet. Pete sprang nimbly in the air, clutched one of the iron bars which were fitted horizontally from wall to wall of the car, close to the roof, and bracing his feet against another bar, hung on for dear life.

The lion looked from one to the other with an expression of grieved surprise, took a few steps forward and stopped hesitatingly, evidently uncertain which was the more deserving of its immediate attention.

Apparently deciding in favor of the tall express-messenger, the beast padded silently along with uplifted nose sniffing the air inquiringly. Pete performed an agile gymnastic feat, scrambling awk-

wardly along the bars, something like a man trying to climb up a ladder on the wrong side. The lion followed underneath.

"Take him away, Toby! Take him away!" Pete yelled, twisting his head frantically from side to side in an effort to see what the lion was doing.

"Look him in the eye!" suggested Toby maliciously. He felt that he could afford to be facetious, as he was in a safe place. "The hypnotic power of the human eye will quell any wild beast! Look him straight in the eye!"

"How in blazes can I?" demanded Pete fiercely. "I ain't got eyes in the back of my head! Where is he, anyway? I can't see him at all!"

"Help! He's after me!" shrieked Toby loudly.

Attracted by the sound of another voice, the lion turned and was sniffing the edges of the crate on which the trembling baggageman had taken refuge.

"Well, you ain't afraid of him! Get down and throw him out the window," counseled Pete. "Why don't you do something besides jump up and down and yell? The brute won't hurt you if you ain't afraid of him. Get down and grab him while you got a good chance!"

"Look him in the eye! Look him in the eye!" vociferated Toby. "Help! Help! He's comin' up here after me! Oh! look him in the eye!"

From his aerial perch Pete could see the agitated figure, shrinking against the wall, as the lion, its inspection of the lower slats finished, slowly reared on its hind legs and thrust a blood-stained muzzle over the top of the crate.

"Murder! Get a gun and shoot him!" yelled Toby, making a vain attempt to climb up the side of the car. "Why don't you shoot him?"

"Where's the gun?" demanded Pete. "I can't shoot him without something to shoot with, can I? What did you do with the gun?"

"It's over on top of the safe. Oh! Oh!" The lion had slipped back on all fours again and was poised for a spring, its hungry eyes gazing at the plump morsel on the crate, just out of reach.

Pete began a hazardous journey along the bars in the direction of the safe; but at his first movement the lion suddenly turned, bounded half the length of the car, and with a loud snarl, stood directly under the gymnast, who, paralyzed with fright, hung suspended by hands and feet craning his neck to observe the menacing beast beneath.

"I AIN'T GOT EYES IN THE BACK OF MY HEAD!"

"Why don't you get down off that monkey perch and look him in the eye?" Toby had somewhat recovered his composure, now that the lion's embarrassing attention was directed elsewhere. "The power of the human eye—"

"Hang the human eye! Catch him! You said you wasn't afraid! Grab his tail before he jumps! He's got me!"

But he hadn't. Once more he had padded swiftly back to the crate. Pete, heartened by the respite, made desperate efforts to hurry along the roof toward the revolver, which lay at the forward end of the car, on top of the express company's safe.

"IT'S A SHAME! POOR, DEAR LITTLE BABY!"

His anguished cries temporarily hushed, Toby squeezed into as small and inconspicuous a compass as possible and watched his companion with bated breath.

Reaching a vantage-point directly over the safe, Pete cautiously reached down and secured possession of the revolver. Then traveling backward, hand over hand, he braced his feet firmly between the bars, took a tight grip with his left hand, and twisting his body half around, pointed his weapon at the yellow peril which sat on its haunches in the middle of the car.

There was a flash, a puff of white smoke, a deafening report, and a roar of pain from the top of the crate. Two more reports sounded in quick succession. When the smoke cleared away the enemy was observed still sitting calmly on the floor, while Toby, his eyes popping from his head, was hopping up and down on one foot and holding the other with both hands.

"Don't you shoot that gun again!" he bawled, as Pete prepared for further target practise. "What do you think you're aimin' at, eh? I ain't the lion!

"Did you get hurt?" inquired Pete anxiously. "I don't see how the bullet come to go so high; I aimed low."

"Aw, you couldn't hit a barn, unless you went inside and shut the doors!" snapped Toby bitterly.

He put his other foot down and gingerly rested his weight upon his toes, which still stung where one of the bullets had carried away a portion of the sole of his shoe.

"Gimme the gun. You ain't to be trusted with firearms—not when I'm around. I got a wife and three children to support, and I ain't takin' no chances."

"I done the best I could," apologized Pete. "It ain't the easiest thing in the world to shoot straight when you're hangin' from the ceiling, upside down, like a fly. I'll just try again."

"Not much, you won't! Throw that gun over here. The brute's quiet now, and I can hit him easy."

The revolver hurtled through the air and landed on top of the crate. Rising, the lion capered blithely over toward its late prison. Toby, in a panic, seized the weapon almost before it had touched the boards at his feet and blazed away at the approaching yellow eyes.

"Hit him easy, can you?" jeered Pete. "Point the *end* of the gun at him—not the butt!"

"Bang! Bang!" The car was filled with smoke.

"Ouch!" screeched Pete, clutching frantically at his trousers. "I'm shot! I'm shot!"

His feet slipped from between the bars and he swung to a vertical position with a jerk that nearly wrenched his arm free from its socket. He made a wild but ineffectual effort to regain his position; but the lion rushed forward, and his arms seemed to partake of the paralysis of his mind.

The next instant he was lying on his back on the floor, bawling lustily for assistance.

"Good-by, Pete! Good-by!" Toby dropped the now empty revolver and leaned mournfully forward to see the last of the victim. The crate overbalanced, trembled, swayed, and plunged

over with a crash, sending the baggageman sprawling on his hands and knees.

"Help!"

"Murder!"

"*Gr-r-r-r-r-r!*"

Pandemonium broke loose in the car. Around the floor rolled a rapidly rotating mass of yelling men and snarling mountain lion. Now and then an arm or leg emerged for an instant, only to be immediately drawn back again into the chaotic maelstrom. The crate of chickens was smashed to fragments, and the dismal squawking of the terrified fowls added to the hideous din.

In the midst of the hubbub, the side door was slid back, and the astonished face of a station agent peered in at the combat raging on the car floor.

The newcomer gave but one look. Then a large white hen, noting the open doorway and seeing a way of escape, launched herself with outspread wings and deadly accuracy full in his face. The feathered catapult was followed by another and another. The horrified agent, leaping from the top of the raised baggage platform upon which he had been standing, tore down the track.

From every car window a head emerged, only to be hastily withdrawn, as word was passed along inside the coaches that in the baggage-car a fight to the death was being carried on between a man-eating lion, which had broken out of the iron cage designed to hold him during his transportation to the menagerie at Bronx Park, and started to make a meal of the express-messenger.

Another story had it that the ferocious and bloodthirsty animal had sprung out of a tree in the woods, climbed through the window of the locomotive, and fallen tooth and claw upon the engineer, whom the fireman had tried to defend with the shovel.

Armed with a highly gilded ax, selected from the accident equipment, and followed by several brakemen similarly protected, the conductor hurried to the scene of the fray. Inside the car, the spinning whirl of man and beast had abated no whit, while the noise had, if possible, increased.

"Kill him, somebody!" came Toby's now feeble voice from the center of activity. "Kill him!"

The rescuing party hesitated — not from lack of valor, or a desire to grant the request, but because an attempt to cut short the career of that writhing yellow body was reasonably certain to result in the performance of a similar office for one of the human arms or legs thrashing about in the air.

A crowd of awestricken passengers had gathered—at a safe distance—offering advice and suggestions innumerable; but the battle waged on with no hope that it would come to an end until the fierce beast of the jungle either tired out his victims and despatched them, or stayed in one position long enough to enable some one to hit him.

Suddenly a piercing scream rose high above the clamor. A girl rushed through the crowd, scrambled upon the baggage platform, and sprang into the car.

"Oh, Baby! Baby!" she wailed, wringing her hands. "What are they doing to you?"

From the swirling, twisting cyclone on the floor at her feet, a tawny head reared itself, then appeared a neck, followed by a long, slim body and a waving tail, as the lion with a mighty heave shook itself free and sprang toward the girl.

A gasp of horror went up from the onlookers. The conductor raised his ax with murderous intent. The girl sank on her knees. Wreathing her arms about the neck of the ferocious brute, she put her face close to the gaping jaws and—kissed the black nose!

"Oh, Baby, dear!" she cried, with a quivering break in her voice, "what did they do to you? Did the nasty men try to hurt my little pet? The hateful horrids!"

The lion stood with drooping tail and dejected mien, now and then lifting a pair of pathetic eyes to the solicitous face bent above him.

"It's a shame, so it is. Poor, dear little Baby!" The girl cuddled poor, dear little Baby's massive head under her arm and turned indignantly to face the stupefied conductor.

"What does this mean?" she cried. "I demand an explanation. Who are these men"—pointing an accusing forefinger at Toby and Pete—"and by what right do they maltreat my pet?"

"Her pet!" choked Pete miserably.

"Pet!" moaned Toby, leaning weakly

against the side of the car and holding together such fragments of his shirt as had not met Baby's claws.

"That's a fine, tidy pet, beggin' your pardon, miss. He broke open his cage and made a dead set at Pete and me. I just got my foot out of the way before he grabbed it, but he tore off part of the sole with his teeth! And Pete—why, I thought he was a goner, sure. The beast chased him all around the car and he got him down and I tried to save him, and he—"

"You are not telling the truth!" broke in the girl. "Baby wouldn't hurt a fly. You must have been teasing her, or she thought you wanted to play. Why, she's been a pet ever since she was a week old. Even if she wanted to hurt you, she couldn't. She's so old all her teeth are gone but one or two. Perhaps she was hungry and got out of the cage to get something to eat. I don't suppose you were decent enough to feed her"—with contemptuous scorn. "And then you fired that thing at her, and struck her—and I think you both ought to be ashamed of yourselves! I'm going to make a complaint against both of you. The idea—to hurt a poor, helpless animal!"

"Please, miss—we didn't know she was tame," began Pete.

"You surely didn't think she was dangerous?" asked the girl.

"Oh, no, miss," Toby hastened to assure her, "but we thought he — er — she might be a valuable animal, you see, and when she got out, we thought we ought to try to put him back, and she wouldn't go—and that's how it was."

"Beg pardon, miss," suggested the conductor respectfully, "but we'll have to be moving on. We're late now. I'll see that the animal is taken care of, all right."

"I will not leave her!" declared the girl firmly. "I shall stay right here with her and see that no one abuses her any more."

The incensed young woman was finally prevailed on to return to her seat in the passenger coach, a tired mountain lion was again nailed up in its crate, and the train proceeded on its way.

Pete sat on the extreme edge of a chair, wincing at every lurch of the car, and smoked his pipe in sullen silence. Toby preferred to stand; he said it was more comfortable.

It was some time before either spoke apparently the desire for conversation was lacking. Then Toby, pausing before the dozing animal in the crate, looked down at the floor and spoke in measured tones.

"The hypnotic power of the human eye—"

"Cut it," ordered Pete briefly.

—"can quell—"

"Any *wild* beast," finished Pete with sudden inspiration. "This one wasn't wild, and so"—he leered at Toby—"the eye-power theory ain't had a fair test. But so long as you wasn't afraid, it didn't matter, anyway."

THE BRAKY'S SONG.

BY GORDON SEAGROVE.

Written for the "Railroad Man's Magazine."

I BREATHE the scent from the new-stacked hay,
Red-gold in the autumn sun.
My kingdom is the right-of-way,
My castles—the tanks on the run.
My song is the hum of the trail of steel,
And the honk of the flying goose.
But life is sweet from my airy seat,
In the cab of the old caboose

My promenade is the box car's deck,
My light is the switch-lamp's glow.
Yet many a man would trade with me
For the open life, I know.
For mine is the life of joy and toil,
With the Springs of Love turned loose;
The fields, the sky, my pipe, and I,
In the cab of the old caboose

A SCRAP-HEAP OF HOPE.

Shattered Dreams of Earnest Inventors Who Found After Years of Striving That Their Strange Patents Would Not Benefit Railroading.

BY WINTHROP R. ELLIOTT.

FOR a great many years the United States Patent Office required inventors to submit a working model of their device with their application for a patent, or one which made its workings sufficiently plain if a working model was impossible.

With the growth of the Patent Office, this practise speedily became cumbersome. Models multiplied, storage became a problem, and finally the practise was abandoned save in exceptional cases. But one hundred and sixty thousand models had already been stored, catalogued, and arranged at this time. Moreover, in certain lines of unusual importance, models of foreign inventions were included that the "state of the art," as the patent expert calls it, might be seen at a glance.

Thus, in the locomotive cases, the curious visitor could see not only the beginnings of American practise, but compare these models with Stephenson's "Rocket," the "Puffing Billy" or models of the first model of Richard Trevithick.

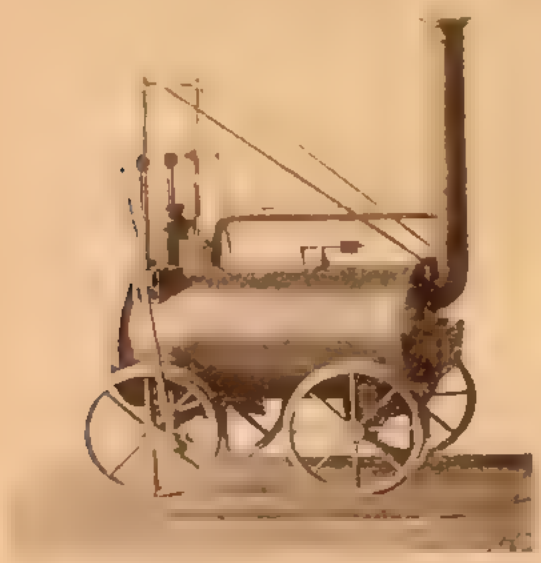
But Congress, in an economical mood, decided that paying rent for a huge model hall was a useless expense (the models had long since been crowded from the Patent Office itself),

[illegible] YEARS [illegible] THE [illegible] AT WASHINGTON [illegible], BY ASPIRING INVENTORS. MR. GILL WAS BORN AT MIDDLEBURG, VIRGINIA, EIGHTY-THREE YEARS AGO.

Photograph by Darnell, Washington, D. C.

and so it was ordered that this unique and wonderful collection of relics of American inventions should be stored away in boxes and preserved for posterity in the caverns of the subcellars of some new government buildings.

The curious visitor may no longer compare the "Rocket" with the "Puffing Billy," nor the Ross Winans locomotive with the double combination freight



FIRST LOCOMOTIVE OF RICHARD TREVITHICK BUILT IN 1790. IN 1804 IT RAN OVER A TRAMWAY IN WALES, HAULING TWENTY TONS OF IRON. THE FIRE BOX WAS IN FRONT

and express engine of Nicolls, nor observe the care with which the often dainty, and sometimes wonderfully practical, models were made, nor stand in rapt attention before a glass cage and muse on the oddness of the engineering ideas of many an inventor now gone to his reward!

No more can he induce Richard C. Gill, custodian of the models, whose patient care arranged and classified them, and whose knowledge of each one of the hundred and sixty thousand is as the knowledge of a librarian of his books, into opening cases for him that he may see, finger, and even photograph a rare model.

Not that Mr. Gill is less obliging now than then, but now it takes days to get models from their present plight, and physical labor to shift cases and unpack them. Also, many of the delicate models would not stand transportation very well, and the jarring and breakage incident to loading and unloading heavy wooden cases full of delicate mechanism has wrought ruin among many of them. Therefore, the accompanying photographs, which the writer made himself before the models were stored, have the unusual interest of being unique.

It is odd what contrasts time can effect, and what strange bedfellows invention, like politics, may bring together. There was Stephenson, whose "Rocket" won an English prize of two thousand five hundred dollars in open competition with the locomotives of two other firms —the "Novelty" of John Braithewait, and the "Sanspareil" of Timothy Hackworth. It had two eight-inch cylinders, with a stroke of 16½ inches, driving wheels of the enormous size of 4 feet 8 inches, weighed, with its tender, between 7 and 8 tons, and could pull a gross weight of 40 tons at the unheard of speed of 14 miles an hour!

The indifferent will see in this only a curious attempt to make a tractor different from others. But those who know anything of the engineer's history will recognize the adaptation of a high-pressure mine-pump to traction work.

It was in 1790 that Trevithick built his first high-pressure steam-engine, and two years later, in 1801, the first steam-engine which ever pulled itself along, traveled over a road in Cornwall. In 1804 the locomotive illustrated ran over a tramway in Wales, hauling twenty tons of iron. The fire-box was in front, so that the engine had to be stopped in order to "stoke up." It had a safety valve, and the exhaust-pipe of the single upright cylinder led to the smoke-stack, so that its power might aid in the draft of the fire.

All the beauties of the invention of John L. Whetstone, of Cincinnati, who, in 1801, took out patent No. 33,760, designed for slow-moving freight, and more especially as a substitute of the canal mule, are not visible in the picture. While the absence of any connecting-rods and their elimination by numerous gear-wheels is a feature of the engine, its main claim to fame rests on the fact that it is propelled, not by traction gained from its weight on the rails on which it runs, but by a system of

MODEL OF STREET-CAR LOCOMOTIVE MADE BY P. S. WINANS IN 1851

Since 1836, when the Patent Office was created, 1,034,427 original patents have been issued. Of these, 160,000 were strange mechanical devices, many of which were intended to improve the locomotive. The Patent Office model hall has been abandoned and these curious relics are now dust-laden in storage.

levers by which the weight of the engine pinches two driving-wheels together on either side of a single central rail.

Hence the horizontal gear-wheels at the top and the horizontal driving-wheels beneath. Nor did Mr. Whetstone claim this idea as entirely new. The single claim of his patent starts with this *apologia:*

I do not claim, broadly, the use of driving-wheels acting on opposite sides of the same rail, as that is described in the patent granted to G. E. Sellers in the year 1847, but:

What I claim as my invention and desire to secure by Letters Patent, is—

The use in a locomotive of wheels applied to bear against opposite sides of a rail, in combination with wheels [illegible]:

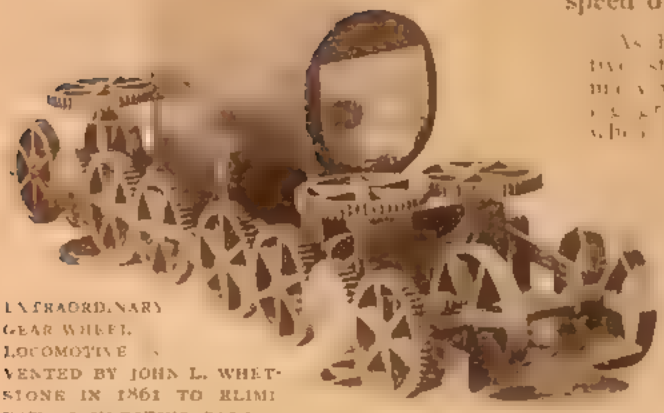
ATLANTIC ENGINE WITH INDEPENDENT SMALL AND LARGE DRIVERS FOR FREIGHT AND PASSENGER TRAINS.

Though the conception of freak locomotives meant years of concentration and patience, not one of them ever came into actual use or brought to the inventor any return other than the keenest disappointments. The bizarre models, now removed from the public gaze, are the tombstones of hope.

EARLY TYPE OF FREIGHT ENGINE, PRIOR TO 1850

INVENTORS SENT IN MANY QUAINT WOODEN MODELS OF THEIR PATENTS

REMARKABLE LOCOMOTIVE DESIGNED BY E. F. JOHNSON IN 1844. THE DRIVERS WERE ACTUATED BY SPUR GEARS IMPELLED BY TWO CYLINDERS, ONE EACH UNDER ENGINE AND TENDER, WHICH WAS REALLY PART OF THE ENGINE PROPER.



EXTRAORDINARY GEAR WHEEL LOCOMOTIVE INVENTED BY JOHN L. WHETSTONE IN 1861 TO ELIMINATE CONNECTING RODS

upon top of the same rail, when the solid wheels derive suitable pressure from the weight of the locomotive through a system of levers or their substantial equivalents as is herein fully represented

JOHN L. WHETSTONE

But if a photographer's convenience has made strange companions of ideas both far distant in time and the place of their birth, consider the uniqueness of bringing together in the pages of a magazine devoted to the modern railway and all its wonders, two pictures of such unique devices as those of G. A. Nicolls patented in 1848, and of Cathcott, patented in 1849.

Both of these locomotives were designed with the same end in view: to gain pulling power on grades at the expense of speed, and to gain speed on the levels at the expense of power.

They are really *multum in parvo* engines—combination freight and express motors—designed to save a poverty-stricken railway company the expense of more than one engine when two kinds of work were to be done.

The first seems to modern eyes somewhat the more practical. It is nothing more than two engines run from one boiler—one engine having small driving-wheels for grades, the other, larger driving-wheels for express service.

In his patent, Mr. Nicolls set forth the matter very plainly, indeed, albeit his reasoning takes no cognizance of the matter of leverage, in considering the diameter of his wheels and the stroke of his piston, but merely of the speed of revolution. He said:

As heretofore constructed, [illegible] many serious defects. When [illegible] it requires more power than when ascending them or running [illegible] levels, and yet from the nature of the general construction of locomotives, as [illegible] increases its [illegible] with [illegible], [illegible] ing an increase of power when ascending grades actually has less, from the fact that the increased resistance reduces the motion of the wheels, and consequently that of the pistons, and the power of the engine being due to the pressure of the steam and the motion and area of the pistons, which latter represent the volumes of steam consumed in a given time, it follows that the slower the pistons move the less power the engine will give out.

What are known as "large driving-wheels" possess advantages over small wheels which are admitted and known to engineers—such, for instance, as affording the means of rapid motion without the necessity of "gearing up," as it is termed; but when ascending grades their number of revolutions is greatly reduced, which in turn greatly reduces the effective power of the steam, and therefore renders the engine incapable of ascending grades with such a train as it is capable of drawing on levels.

The object of my invention is to remedy these evils and adapt the engine to the drawing of trains up the usual grades of railroads with the full effective power of the steam generated; and the nature of my invention by which I attain this important end consists in employing, in addition to the usual large driving-wheels, a set of small drivers, operated by an additional pair of engines. By this arrangement, when the engine reaches moderate grades, the steam can be shifted from the engines of the large drivers to those of the small drivers.

MODEL OF ENGINE PATENTED BY G. A. NICOLLS IN 1848 WITH SMALL AND LARGE DRIVERS SO IT COULD BE OPERATED INDEPENDENTLY FOR FREIGHT AND PASSENGER SERVICE.

The difference in the diameter of the two sets will enable the pistons that operate the small drivers to work off all the steam generated in the boiler, and to exert the required force to draw the tram up the grade, although with a reduced speed; and when ascending grades of greater inclination, both sets of engines and drivers may be brought into requisition, and thus the locomotive adapted to all the circumstances of the road, and rendered effective in carrying trains over the whole length of the road without waste of power

Mr. Cathcott's invention gets at the same result in another way. He had two sets of drivers—a large pair and a small pair both connected to the same cylinders with the same connecting-rod. He employed a variation of the jack-screw to raise from the track that pair which he did not wish to use, letting the other pair take the weight of the engine.

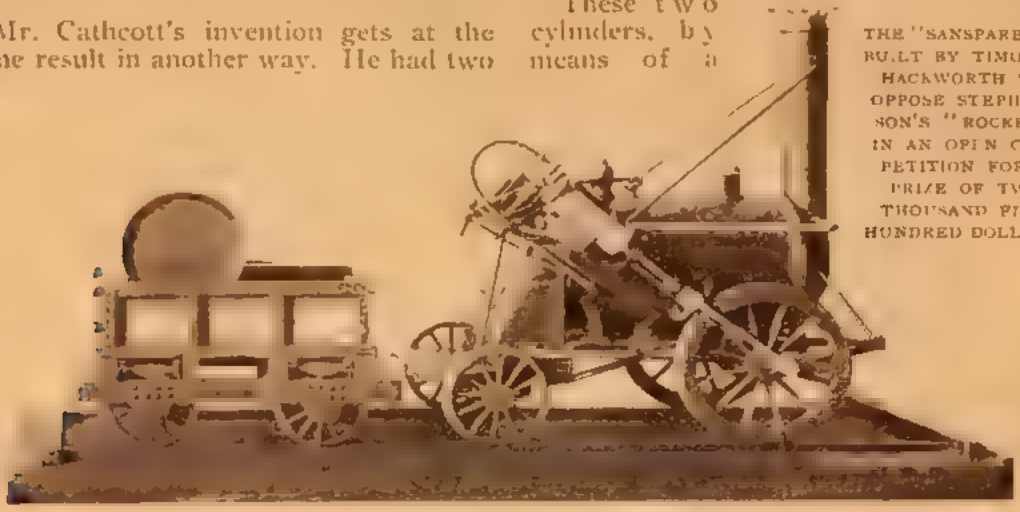
Thus, when he wished to start a heavily laden train, or go up a steep grade, what could be simpler than to jack up the large drivers and let down the small ones? The large drivers would then revolve idly in the air, and, as may easily be seen, the distance the drivers need be raised is very small.

Similarly, when speed was an object —say, when the train was ten minutes late or the track level and the wind behind—it would be but a matter of a few minutes to screw up the small drivers and let them do the idle revolving, while the large drivers carried the whole forward at twenty miles an hour!

But the prize for the oddest of odd locomotive patents which ever wiggled through the Patent Office must be given to E. F. Johnson, who took out patent No. 3866 in 1844. So very odd, indeed, is this conception, that it is rather difficult to describe it without a full set of working drawings and many complicated letters, figures, and diagrams.

Although the picture shows no cylinders, there are two—one under the boiler and one under the tender. The tender, by the way, is an integral part of the locomotive and is not simply coupled to it.

These two cylinders, by means of a brake beam sort of construction and connecting-rods, are connected with huge spur gears which interlock, thus keeping the pistons always in the same relation to each other



THE "SANSPAREIL," BUILT BY TIMOTHY HACKWORTH TO OPPOSE STEPHENSON'S "ROCKET" IN AN OPEN COMPETITION FOR A PRIZE OF TWO THOUSAND FIVE HUNDRED DOLLARS.

From these gear-wheels, other connecting-rods work the drivers, of which there are eight—four under the forward truck and four under the tender.

Now, the remarkable part of the invention is this: When it is desired to reverse this engine, the position of the drivers with reference to each other is altered by means of a worm and segment motion not shown in the model because operated underneath.

The wheels are mounted loose on the trucks proper, with roller bearings, so that, when the engine is stationary, the worm and segment may drag the wheels forward in the trucks sufficiently to bring the connecting-rods to the top if they are at the bottom, or to the bottom if they are on top.

Thus, if the position of the engine when it stops is such that a push on the piston will propel the engine forward,

and it is desired to go backward, the worm and segment is manipulated and the position of the wheels and connecting-rod altered without moving the pistons, so that the same push on the piston would operate the engine backward!

In the early days of steam, as applied to railways, there was less consideration given to operating expense and to the comfort of passengers than there is today. Those early engineers had the world before them where to choose, and chose almost anything they desired—at least on paper and with patents. Hence the beautiful Ross Winans model of a street-car locomotive, made in 1851, in which a short-coupled effect is obtained by having the connecting rod work a crank and gear, the other end of which system works the drivers.

The long stroke and great radius of crank is thus obtained in half the distance ordinarily required. Note the careful wood covering of the boiler and the cylinder, and the neat brass railing which surrounds the platform where the combined driver and fireman was supposed to hold forth. For this was for city use and, of course, must be neater and more attractive than the iron horses of the country rails.

A tribute must be paid this model maker, for this is a practical working model and most beautifully made. Even now, many a year after its construction, it works smoothly and evenly to the touch—more so, alas, than the full-sized engine ever did. For, even as the flower of which the poet sang so sweetly, full many a patent is born to die unseen, unknown, and untried. Of the two hundred thousand and more in the Patent Office which never got any further than models and an inventor's dream of wealth, this, and many like it in the railway division, are by no means the least.

HORSE-POWER AND ELECTRICITY.

WHILE most electrical apparatus is rated in terms of electrical units, it is customary to express the capacity of electric motors in terms of the horse-power, and this unit consequently has great importance and interest for electrical engineers. It is not generally realized that the term horse-power, as it has usually been defined, does not represent a definite amount of power, since the value of the unit varies from place to place

The horse-power is usually defined as representing the performance of 33,000 foot-pounds of work per minute, and a foot-pound is defined as the work done in raising a mass of one pound a vertical distance of one foot. This makes the horse-power depend upon the gravitational force acting upon a mass of one pound, and it is well known that the gravitational force varies with the latitude and with the altitude above the earth's surface. While this variation only amounts to a fraction of one per cent, it is nevertheless quite an appreciable value and it would seem highly desirable that this important unit should be so defined that its value is quite definite and everywhere the same.

The Standards Committee of the American Institute of Electrical Engineers has adopted the value of 746 watts as representing a horse-power. As the electrical units have been legally defined and represent more definite values than the mechanical unit here involved, it seems very desirable to define the horse-power in terms of electrical units and thus give it a more definite value than it has had in the past. The value of the horse-power has never been fixed by statute in this country, and if the necessity for the legal determination of its value should arise it is probable that the common definition stated above would be the one recognized.

A legal enactment of a new and exact definition is therefore highly desirable, since an agreement for use or even a general adoption by all electrical engineers would not give a new definition any legal force or effect.

It would be highly desirable if all power, whether electrical, mechanical or thermal in its nature, were expressed in terms of watts or kilowatts, but since it can hardly be expected that men in all walks of life will be willing to abandon the more generally used unit of horse-power for the electrical unit, it seems highly important to define the former in terms of the more precise value of the latter.—*Electrical Review.*

Indifference is a broken rail on the main line of effort.

JOHN G. DREW, VICE-PRESIDENT IN CHARGE OF ACCOUNTS OF THE MISSOURI PACIFIC AND THE ST. LOUIS IRON MOUNTAIN AND SOUTHERN RAILWAY COMPANIES

Photograph by J. Kaiser.

JOHN GRAHAM DREW.

At a recent meeting of the directors of the St. Louis, Iron Mountain and Southern Railway companies, John Graham Drew, general auditor of the systems, was elected vice-president in charge of accounts. Mr. Drew was born at Hammondsport, New York, February 12, 1864. On January 28, 1881, he entered the railway service as station clerk at Seneca, Kansas, on the St. Joseph and Western Railroad, now the St. Joseph and Grand Island. He remained

with that railroad until June 1, 1899, filling consecutively the positions of telegraph operator, agent, superintendent's chief clerk, general manager's chief clerk, general bookkeeper, chief clerk to auditor, and auditor. He was appointed to the latter position on January 1, 1892, and on June 1 1899, left the company to accept the position of assistant comptroller of the Great Northern Railway with headquarters in St. Paul, Minnesota. On January 1, 1902 he was made comptroller of the Great Northern, remaining in that position until June 1, 1911, when B. F. Bush, who had just taken hold of the Missouri Pacific-Iron Mountain System a month previous as its president, engaged him as general auditor for that company. He held that position until his promotion to the vice-presidency of the two Middle West railroads

JIM RILEY'S FANTOM TANK.

BY H. B. CRAIG.

JIM RILEY, the big, jovial engineer on the western division, was called long before daybreak to take the 420, a ten-wheeled compound, out on a circus extra. He went to his boarding house to get his overalls and dinner-pail before going to the roundhouse.

After coupling up, Jim looked back and noticed that the head car was an unusually large one with an opening in the forward end covered with canvas.

They had run about eight miles when the injector-check broke and Jim told the fireman to go back and see how much water there was in the tank.

"Not a drop," exclaimed the fireman in astonishment when he returned to the deck.

"We had a full tank at the roundhouse," said Jim.

"Yes, the tank was full, because the roundhouse flunky ran water over the sides and got his feet wet," answered the fireman.

"Well, we'll have to cut off and run for water. That is all there is to that," replied Jim. He shut off and applied the air. Coming to a stop the fireman got down and cut her off, and they started for the nearest water-tank.

They were soon back on their train—and on their way. After running about fifteen miles the injector broke the second time.

"Go back and look at the water again," said Jim to the fireman.

"She's dry again," said the fireman on scrambling over the coal.

"Well, I'll be hanged if I can understand this. I looked the tank over before we left and there wasn't a sign of a leak," said Jim with a perplexed look.

They stopped and cut off for another run for water. When they coupled on for the third time, the trainmaster climbed up on the engine, he having been on the second section, which was standing behind Jim's train.

"What is the matter, Jim? You are laying everything out," he said.

"I can't make it out. The tank don't look a bit, and I have been working the injector down fine," replied Jim.

Running along for a few miles the injector broke the third time. Then the trainmaster went back on the tank to look at the water. Returning he told the same story the fireman had twice told; "not a drop."

They cut off and ran to Lennox for the third tank of water. When they returned the day was just breaking. After the brakeman had coupled up they started for Lennox, where the show was going to play that day.

"There is a hose on the tank and water is shooting out of it like a water-spout," exclaimed the drenched fireman a few minutes later, coming into the cab.

"Spirits," shouted the trainmaster, getting down from the fireman's seat-box just in time to get a dose of water from the back of the tank.

Jim hustled up on the coal only to see what appeared to be a rubber object draw out of the manhole in the tank. He met a stream that knocked him on the deck. Getting up he looked over the coal and then almost fainted.

The canvas was raised over the hole in the head car, and out of it stuck the head and trunk of "Rajah," the clown elephant.

Since then the following bulletin has been posted on the board:

> To all freight C and E., Western Division:
> Hereafter when crews are called to handle circus or carnival trains, the conductors and engineers shall see that no cars containing long-necked or trunked animals are hauled next to engine.
> (Signed) TRAIN MASTER.

The Ugly Circle.

BY GEORGE FOXHALL.

Both of the Kellys Knew Why Jim Was Caught with the Goods.

SNARLER KELLY peered through the bars into the prison cell in which sat, sullen, defiant, and nursing a desperate revenge, his only son. At first he sidled up and peered stealthily, as one not certain of his reception; but as the young man's face lit up at sight of him with something between recognition and welcome, he stood more clearly fronting him and gave him husky greeting.

"How is it, Jim? Cheer up, boy! Two years don't last long."

"No, it won't be long," agreed the son. "Don't worry about me."

"Jim, I know you never pulled that job. Somebody's stuck the goods on you an' got you in queer."

The other looked up with slow inquiry. "What makes you think so?" he asked.

"Think so! Weren't you always too blamed honest to suit your dad? You'd act tough an' ugly, an' rough-house it with the best of 'em; but I never could get you to be anything but honest. Somebody's crooked this onto you, an' I'm going to find out who did it."

"Right," said Jim dejectedly; "somebody loaded me with the goods until it looked like a clear case; but who done it? That's the puzzle."

"I'll bet I'm not so far from guessing," said the older man, with the ugly snarl that had earned him his name. The other was quiet for a moment.

"Well, why don't you say it?" he said at length.

His father leered at him through half-closed eyes of infinite cunning. "What about Shaggy Summers?" he ventured, speculatively.

For a moment it looked as if there would be an explosion of wrath, but Jim repressed himself with an obvious effort. "The only friend I've got," he said quietly. "Guess again, or never tell me if you've guessed right."

"Maybe I did guess wrong," soothed the other, "but I should think you'd reckon your old man as one of your friends, Jim, though he ain't no saint. Anyhow, it's your old man that's going to find out who's put you here."

"Be waiting for me when I come out," assented Jim, with more of warmth and life than he had shown before, "and let me know who it is. I guess two years won't make me love him more." The quiet viciousness of the man was indescribably terrible.

His father turned and passed into the light of the free air, while the son looked after him with a scowl of dreadful hate. "I only hope that he won't get wise to what I know," he muttered deeply.

The other, with a leer of uneasy triumph, drew the sweet air deep into his lungs. "I reckon I'm getting slick, as well as ugly," he whispered to himself; but long before the day of liberty, fear had driven him from his old haunts to the endless hobo trail, for none knew better than he who, to save his own skin, had "put the goods" on Jim.

II.

SNARLER KELLY plugged doggedly alongside the railroad track and meditated on ugliness. Even apart from

the dismal desert landscape he had plenty of material for meditation, for to achieve ugliness had been the ambition of his degenerate life, and in that, at least, he had not failed.

The Chicago stock-yards had known and cleansed themselves of him, the freight-yards had feared him, and Clark Street had conceded him "tough." His meditations took him back—far back, into those old days when his reputation as an "ugly guy" was just emerging from the hoodlum state of youth to the deeper criminality of manhood.

His thorough ugliness, unstrained by pity or regard, untinged, even in the most casual affairs, by any light of common courtesy, made him a thing to be feared and hated even where ugliness was a weapon of survival. Yet Snarler was judicious in his reputation building. Those whose ugliness he feared might match his own in a show-down, were never invited to a show-down.

On this principle he had chosen a wife—a little woman who had married him because she had feared to refuse him, and whom he had married because of the delicious pleasure that fear gave him.

But it's the boy, Jim, with whom this story is chiefly concerned. The Snarler had built up fond hopes of being mighty proud of Jim, for at an early age Jim showed himself an apt pupil in the lessons of ugliness which his fond parent constantly instilled. Indeed, if the Snarler could but have understood it, there was something back of the boy's ugliness infinitely more to be dreaded than the shallow viciousness of his own. The subtle quality called character—whether good or bad—perhaps was in the making.

But the Snarler did not understand it. He saw the youngster's formidable strength and utter lack of feeling as he shouldered his way surlily through the rough life of the Chicago slums, and encouraged and applauded. And then came the shock.

One day, the time, in the estimation of the Snarler, being ripe for more definite instruction in the training of his offspring, he had broached unto Jim the pulling of a pretty bit of villainy which was to nourish his own empty exchequer and start the young man upon his natural career.

The boy listened until the man was through, his eyes on the ground and his accustomed scowl knitting his brow. Then he looked up.

"That's thieving, ain't it?" he inquired.

The Snarler was a little taken aback for a moment. To qualify things had never occurred to him.

"Sure Mike," he said uneasily.

"Then count me out," growled Jim, and started to walk away.

"What's the matter?" sneered his father. "I thought you called yourself a tough guy."

The boy turned. "That ain't being tough," he said, "that's being crooked." And he walked away.

So the kid refused his career, and the Snarler, after hiding his disgust in three days of oblivion, resumed his with the careful cowardice of the petty sneak-thief.

But at length there came a time when, tempted by a seemingly easy opportunity into larger operation, cowardice overreached care, and the trail became too hot for the Snarler's peace of mind. And so, with simple cunning, he had pulled the trick that saved him and sent his son to jail.

Certainly it was upon ugliness that the Snarler meditated as he plugged doggedly alongside the railroad track. Night drew in, and in the distance he saw against the dark sky the panting glare of an engine's exhaust.

Ten minutes later he had swung himself thankfully into an open box car. He struck a match to find his bearings, and found himself staring into the barrel of a big revolver, too dazed to do anything but hold the match and glare fixedly at the peering face in front of him.

The other came to his relief with a short laugh. "That's all right, bo," said he. "I thought maybe you was a shack, an' I'll put a shack's light out before I'll hit the ties and starve in this desert. I'm a tough guy, I am."

"I don't blame you," agreed the Snarler. "I was kicked off myself, yesterday, after I'd lost my gun. If I hadn't lost it—I'm a tough guy myself," he finished significantly.

Overhead there was the sound of heavy shoes. They listened. Then there was the flicker of a light. With easy strength a brakeman had swung himself

into the car, his lantern slung by a string around his neck.

"Hit the gravel!" he growled, as he held the light on them.

"Beat it," snapped the tramp, pushing his big gun into the foreground.

But it was Kelly on whom the brakeman's eyes rested, and he lowered his lantern quickly.

"Beat it, d've hear!" again ordered the gunman.

Suddenly the brakeman dropped to one knee. Like a flash his hand was in and out of his overalls pocket. The gunman's bullet went high and passed through the open door, but the trainman's shot took the other between the eyes, and he lurched forward—dead.

With hardly a look at him the brakeman turned his gun upon the Snarler.

"Turn around an' put your hands behind your back," he ordered, unlooping the rope from his lantern.

The Snarler laughed, a trifle uneasily and sheepishly.

"What's the matter, Jim?" said he. "Don't you know your old dad? You sure are an ugly guy."

And Jim put his face close to his father's. "You bet I know you. An' you bet I'm an ugly guy. You trained me in ugliness, an' I'm learning every day. Your name's scratched on this gun an' there's a sheriff at the next stop. It's an ugly circle, an' you've drew it yourself. Turn around."

SAN DIEGO'S PALM-TREE SPECIAL.

THE WORK OF TRANSFORMING BALBOA PARK, SAN DIEGO, CALIFORNIA, INTO AN EXPOSITION GROUND TO COMMEMORATE THE OPENING OF THE PANAMA CANAL OFFERS SOME PECULIAR METHODS OF TRANSPORTATION. HUNDREDS OF MASSIVE PALM-TREES, SOME WEIGHING FIFTEEN TONS, WERE TRANSPLANTED TO BEAUTIFY THE PARK. THEY WERE HAULED BY TRACTION ENGINES OVER ORDINARY ROLLERS.

A WIZARD OF WRECKS.

H. W. Belknap, Chief Inspector of Safety Appliances, Scientifically Investigates Railroad Disasters to Help the Government Eliminate the Causes of Accidents.

BY RICHARDSON DAVENPORT.

SCIENCE began when man learned that to prevent the recurrence of any series of phenomena — disease, explosion, anything — he had to go back of the apparent facts and search for the cause.

The government believes that a scientific study of wrecks and their causes will result in great direct benefit to the railroads, and to the public at large. Hence that division of the Interstate Commerce Commission which concerns itself with the enforcement of the safety appliance law, the hours-of-labor law and the air-brake law, and also interests itself in wrecks of all kinds.

The chief inspector of safety-appliances is Mr. H. W. Belknap. If you walk into his rooms in a down-town business building in the city of Washington, you are more likely than not to be met with the information that "Mr. Belknap is away investigating a wreck," for he not only has charge of twenty-nine other inspectors, but he himself investigates wrecks wherever possible. More especially, he devotes his personal attention to those catastrophes which are made the subject of investigations by State railroad commissions, and so accurate are his methods and so far-reaching his results, that he has brought about a spirit of cooperation between his department and State commissions.

If you find Mr. Belknap "at home," you will see a full-faced, hearty mannered man who looks you straight in the eye, has a handshake that means something, and who has "railroad man" written large all over him.

"Oh, we are all railroad men in this work," he says. "A man must have at least eight years' practical railroad experience behind him before we will consider his application for the position of inspector. On my staff I have former superintendents, trainmasters, air-brake instructors, road foremen of engines, despatchers—why, I spent fifteen years on a railroad before I was appointed an inspector, and when I did get the appointment, I walked off a train and into office!

"My people are all railroad people. When your mother's people have been railroad men, and your father's people were railroad men, you grow up in a railroad atmosphere. I started as a telegrapher. But the forty a month didn't look so good when I found brakemen getting fifty-five and sixty, and conductors more, and I wasn't long getting over the wheels myself.

"This is a practical department, and while theory has an important place, we believe that every man on the work must have practical first-hand knowledge of railroad work."

It was in 1893 that the safety-appliance law was passed. The five years given railroads to comply was extended to seven years—and then a seven months' extension was given, so that it was not until 1900 that safety-appliance inspection became a necessity. Mr. Belknap came on duty in 1903, when he was one of twelve inspectors. As he became chief

inspector in July of 1911, he added eight years as an inspector to his fifteen years' practical experience before he took charge of the work.

The whole country is divided into fifteen districts, in each of which are two inspectors to see that the provisions of the safety-appliance and the air-brake laws are carried out. In addition, there are six inspectors to keep track of the enforcement of the hours-of-service law, which prohibits the employment of any man for more than sixteen hours continuously. These are also under Mr. Belknap's command.

Perhaps the most important work that Mr. Belknap does is that of accident investigation, which is made possible by the law of that name enacted in 1910.

H. W. BELKNAP, WHOSE OFFICIAL TITLE IS CHIEF INSPECTOR OF SAFETY APPLIANCES AND WHOSE DUTY IS TO INVESTIGATE EVERY WRECK AND MAKE A DETAILED REPORT TO THE INTERSTATE COMMERCE COMMISSION

Photograph by Harris & Ewing, Washington, D. C.

The most vital part of this act is its third section, which is quoted in full:

> The Interstate Commerce Commission shall have authority to investigate all collisions, derailments, or other accidents re-

sulting in serious injury to person or to the property of a railroad occurring on the line of any common carrier engaged in interstate or foreign commerce by railroad. The commission, or any impartial investigator thereunto authorized by said commission, shall have authority to investigate such collisions, derailments, or other accidents aforesaid, and all the attending facts, conditions, and circumstances, and for that purpose may subpoena witnesses, administer oaths, take testimony, and require the production of books, papers, orders, memoranda, exhibits, and other evidence, and shall be provided by said carriers with all reasonable facilities: *Provided*, that when such accident is investigated by a commission of the State in which it occurred, the Interstate Commerce Commission shall, if convenient, make any investigation it may have previously determined upon, at the same time and in connection with, the State commission investigation. Said commission shall, when it deems it to the public interest, make reports of such investigations, stating the cause of accident, together with such recommendations as it deems proper. Such reports shall be made public in such manner as the commission deems proper.

Some of these reports are very elaborate. For instance, there is the report of the investigation of an accident on the Great Northern, which is illustrated with twenty-six photographs showing the steel-rail investigations of the engineering assistant of the Bureau of Standards. It is only slightly less elaborate than the report of an investigation of an accident on the Lehigh Valley, illustrated with twenty-nine really remarkable pictures both of steel rails, rail tests, and the accident itself. Sometimes these reports develop facts which have a wide public appeal, for instance, the report of the investigation of an accident on the Chicago, Milwaukee and St. Paul shows both in text and pictures the enormous percentage of safety in favor of steel cars.

Must Find the Real Cause.

In addition to the special reports issued, there are the accident bulletins which cover the investigations for periods of three months at a time, giving in brief the result of all wreck investigations of Mr. Belknap and his inspectors.

All these publications can be obtained for a nominal fee (ten cents usually) from the superintendent of documents at the government printing-office, and a certain proportion of the edition is reserved for free distribution to those interested in the work.

The power of the inspectors at a wreck is exactly as is stated in the law. They cannot order a railroad to do anything or leave anything undone. They cannot discover a cause of a wreck and issue instructions that this cause must be removed in the future. They can only observe, take testimony, and have expert investigation and advice when necessary, to find out the absolute reason for any accident.

The "reason" does not stop with finding out that a train was ditched because a rail was broken. If it was a broken rail, *why* was it broken? How long had it been in service? Who made it, and when and how? What was its formula? Could a fault have been detected in the rail with proper inspection? What particular form of rail disease caused the break? Was it "pipe"? Was it fractured by high-wheel pressure? Was it improperly laid?

Make Steel Tell Its Story.

All such questions regarding structural conditions in the steel rail are turned over to the Bureau of Standards, where the steel rail itself is made to tell its own story to men who know steel and rails as you who read know the face and the minds of your friends. In investigations outside of the domain of mere railroad experience, the inspector gives way to the chemist, to the metallurgist, to the testing engine, and the analysis, so that in the end the *real* cause is determined!

If the reader wonders how this work can be effective with no power over railways to compel them to make the necessary changes in equipment or operation which will prevent accidents, let him consider the following case. It is chosen because the railway on which the wreck occurred is a small, obscure one, and would not, ordinarily, get the same publicity as would attend a similar accident on any of the large systems. In this case, the wreck was not caused by lack of equipment, a broken rail, failure of signals, or running a red light, but by the failure, or rather absence, of any method in operation of the road.

The wreck in question was on the

Ligonier Valley Railway, July 5 of this year. It resulted in the death of nineteen people, with twenty-eight others injured.

The investigation developed the fact that this little railroad was not run according to standard rules. The report showed that the railroad was a single-track line extending from Latrobe, Pennsylvania, to Ligonier, a distance of ten and a half miles. The branch on which the accident occurred, known as the Mill Creek Branch, is also a single-track line, extending from Ligonier to Wilpen, a distance of three and a half miles, with several spur-tracks leading to coal-mines and coke-ovens.

Kept No Record of Orders.

Its passenger-service consists of two round-trips each week-day, starting at Ligonier. The freight-service is the hauling of empty cars to the mines and coke-ovens, the necessary switching, and returning the loaded cars to Ligonier.

The passenger-trains on this branch are not numbered. There is no block-signal system of any kind. Train-movements are governed by orders given by the despatcher to the conductor, either verbally or by telephone, who gives them to the engineer and the other members of his crew. There is no record of train-orders, no train-register is maintained, and the road has no printed rules governing train-operation.

The accident was a misunderstanding, or a failure to obey verbal orders. One train was to meet another at a certain point. The other train was not held. They met—*with a combination-car carrying passengers in front* of the passenger-locomotive—and the result was a holocaust! Mr. Belknap, in closing his report, found:

> This accident was caused either by the failure of the despatcher to deliver, or of the conductor of the passenger-train to understand or obey, the order requiring the latter to hold his train at Ligonier until the freight-train arrived. The weight of evidence, as given by the employees, seems to be with the despatcher, and the conclusion is therefore reached that the conductor is responsible for this collision, either by his failure to understand, or by his failure to obey, the order delivered to him by the despatcher. The whole matter, however, is a question of veracity between the conductor on the one hand, and the despatcher and other employees on the other hand, since there is no written record of the order involved.
>
> As previously stated, the combination-car was being handled ahead of the engine. This is an extremely dangerous manner of carrying passengers. There was ample opportunity of turning this train at Ligonier, so that this car could have been handled behind the engine instead of in front of it. Had this been done, and there seems to have been no excuse whatever for its not having been done, there would undoubtedly have been a material reduction in the loss of life attending this accident.
>
> The method of train-operation on this road is extremely faulty, and until some adequate rules governing train-operation are adopted and enforced, accidents of this character are liable to occur.

While neither Mr. Belknap, nor his inspectors, nor his department, have power to enforce the obviously needed reforms, they have authority under the law to make public their findings.

The publication of this report, the fact that a passenger-carrying railroad was operating in defiance of modern train-practise in a way which is more like the beginnings of transportation than the year 1912, could not help but arouse such a storm of public protest and feeling as to result immediately in a correction of the abuses. It cost nineteen lives. But even with that cost, without the government investigation and the resultant publicity, the evils might have continued.

Railroads Assist at Investigations.

A feature of Mr. Belknap's work which makes a wide popular appeal is the cooperation between the railways and the department in an endeavor to find the truth.

The railway is as anxious to know what causes its accidents as is the public, or the department. Wrecks are not profitable to railways. And because the law wisely states that the result of the investigation cannot be admitted as evidence in any suit or action for damages, the railway knows that it is not hurting itself by getting at the whole truth.

If a railway has "piped rails" laid in ignorance, it wants to know why. If a rail was cut to fit a new frog, and the cutting developed a split web, it wants to know why the rail was retained. If a railway is running trains too fast for

the size and kind of rails it has bought, so that the wheel-pressure and the cold rolling of the steel are bound to cause broken rails in time, it wants to know why. If its signal-system is not working, or failed to work, or could not work, or is defective, it wants to get at the reasons. And the inspectors want to help.

In the file-cases in Mr. Belknap's office are the most complete data and documents imaginable, regarding wrecks, their causes, and results. And whenever any good end will be served, the whole report, often including dozens of most illuminating photographs, is published for the benefit of all other railroads and for the moral effect of the molding of public opinion, on the railroad most intimately concerned.

"We try to get on the spot right away," said Mr. Belknap. "There is no investigation like one made on the spot, and at the time, and that is what we try to do. I go personally to every wreck of importance that I can, and between us all and the cooperation the State commissions and the railroads themselves give us, we are collecting such data as, we hope, will in time show us all what must be done to stop accidents—or the greater part of them—and make railroad travel the safest of all transportation."

That, of course, is a development of the future. Mr. Belknap and his inspectors are gathering the data, finding the causes, laying the foundation.

You have only to have a look at Mr. Belknap and five minutes' conversation with him to feel that when he leaves the remains of a wreck with the belief that he knows all about its cause, he *does* know about it. No theorist governs other theorists in this work, but a practical, experienced railway man, directing other practical, experienced railway men, finding out the reason for those catastrophes which are of utmost concern to railways, railway men, and public alike

REMARKABLE RECORDS OF FIREMEN.

"WE have some data which I believe is fundamental on the subject of firemen," said C. D. Young, engineer of tests of the Pennsylvania Railroad at the recent master mechanics' convention. "It has been worked up with that in view, and I believe it would be interesting to the association to know what has been done by firemen, proving at least what can be done, and then from those figures perhaps we might be able to judge what an average man might be expected to do.

"Last summer and fall some capacity tests were run between Ft. Wayne and Valparaiso, a distance of 105 miles, the idea being to determine just how many cars could be hauled on a given schedule speed. Everything was in good shape for the experimental work. The road foreman recommended a man who has broken all records in handling fuel on a locomotive. He had fired for three hours at speeds greater than sixty miles an hour, an average of 8,400 pounds of coal per hour. Not only did he do that, but he would go back and do it again. His work was done with a No. 5 shovel. Had he been given a larger shovel, I believe he could have exceeded those figures. We have had men on our locomotive test plant fire as high as 9,700 pounds of coal per hour.

"Now these are maximum figures. I believe you will agree with me that we should not expect much more. We know time and again men who are firing 3,000 pounds of coal per hour, for a six or eight-hour run on the road, and they are doing all we can reasonably expect for a single fireman."

ENGINES WERE SAW-MILLS.

WHEN the old "H. N. Jose" was in her prime nearly all the Maine Central locomotives burned wood. At every station you would see enormous woodsheds, open on the side, piled full of wood. To saw this enormous quantity of wood, that the old wood-burners used to eat, they had regular sawing machines, so arranged that they could shift the gear and propel themselves from station to station. The crews lived in a house-car, the foreman acted as conductor, and usually the wife of one of the crew went with them as cook. How queer they would look traveling over the rails of a modern road, hauling the house-car and a flat-car which carried their wood and water. Their speed was about four miles per hour. The engine weighed about six tons. Only one pair of wheels were used for drivers.—Charles S. Given in *Railway and Locomotive Engineering*.

DARING DEATH ON THE GREAT LAKES.

When the Turbulent Inland Seas Had Taken Their Toll of Railroad Heroes, J. B. Ashley, an Obscure Engineer, Invented a Steel Boat that Defies the Most Forbidding Ice Floe.

BY HUGH C. WEIR.

"AND what became of the other thirty-seven?" I asked. I realized instinctively, however, that his silence was eloquent answer

For a moment, Johnson stared out over the gray-white ice-field of the frozen Detroit.

"They went to the bottom with the cars!" he said. "Luck saved two of us when we had all said our last prayer. I —I happened to be one!"

He drew out an age-colored brier, scooped it through a rubber pouch, and shaded a match over its bowl. A spiral of blue smoke curled into the winter air. His eyes were still fixed grimly on the ice.

I don't know what pictures the pipe smoke suggested to him, but for my part the dock-scene had vanished, and in its place I saw the storm-lashed waters of Lake Michigan beneath dark, scudding clouds, a great boat rolling under a death-blow of the elements, thirty runaway freight-cars crashing over her slippery deck, and her crew, exhausted by the losing battle, preparing for another, and more desperate, fight for life as the vessel took her last plunge.

Let me tell you of the foundering of the Pere Marquette No. 18, as Johnson told me on the Detroit dock. It was not only a great marine disaster; it was also a great railroad disaster. The story will show you that the struggles and hazards of the American railroad man are not confined to the land. Railroading on the water? Does this sound impossible?

The steel car ferry, Pere Marquette No. 18, departed on her last voyage across the ice-churned waters of Lake Michigan in the late fall of 1909, loaded with thirty coal-cars.

On the Great Lakes, the railroad man does not reach his terminal because the road bed stops and a hundred or two hundred miles of water stretch before him. He swings his train out onto the deck of a waiting steel ferry-boat, anchors his cars on a floating track, and in from ten to twenty hours runs his train onto the other shore to continue on its way.

The Pere Marquette disaster occurred in the days before the ice-ferries, in the closing week of lake navigation, when the "little ice devils" of Superior were giving the crews of the belated freighters all-night battles. The "Soo" was choking up for its five-months' blockade, and the advance guard of the winter storms was leaving a trail of marine disaster from Duluth to Buffalo.

Captain Peter Kilty, of No. 18—a three-hundred-and-forty-pound giant, who had the reputation of having looked death in the face as often as any man on the Lakes—sniffed the wind with a frown as the ferry bore away from the Illinois shore. There was ugly weather in the air, a fact ominous enough to a vessel with an ordinary cargo, but

doubly so to a boat with a freight-train on board. A string of runaway coal-cars is a grim proposition on land, with a clear track ahead, but in a November gale in the middle of Lake Michigan—well, *you* may think you have been through some nerve-racking moments when your train has broken in two on a mountain grade and you have crowded on every ounce of steam to escape from the plunging cars behind you, and are not quite sure whether the agent at the station ahead will have sense enough to set the switch right for you or not.

Cars Plunging Over the Deck.

If, however, you should be transported to a Great Lakes ferry in the teeth of a sixty-mile gale — the wind sometimes blows eighty miles on our inland seas—with a leak in the bottom, and the pump-gangs working like demons, and the water freezing into six-inch ice on the rails, and then should hear the alarm that half a dozen of the freight-cars on board had broken loose and were crashing through the side, and carrying the boat's last hope with them, it is quite probable that you would consider your previous estimate of excitement bromidically tame.

Such was the situation that confronted the crew of Pere Marquette No. 18. After battling for six hours with a gale whistling down from the Michigan pine woods, Captain Kilty saw his last hope fade. Every pump on board had been working for three hours, and every available man was stationed on the car-deck to watch the fastenings of the chain-anchored gondolas. But there are winds and waves before which chain-links cannot hold.

A regiment of howling demons seemed to be suddenly unloosed from the storm-mist. The boat reeled farther and farther before a wall of white-crested water, towering triumphantly over her. The men, huddled about the freight-cars, flung themselves toward the chains. And then, even above the wail of the wind, came the crunching of wheels torn from their fastenings, a human shriek of agony, and two forty-ton cars were plunging over the shadowy deck!

Three men were crushed into lifeless heaps before the second of the runaway gondolas dashed into the water. The nightmare of the unequal battle for the life of No. 18 had only begun. Two after compartments of the vessel had been flooded from the leaks, and it was evident that the weight of the remaining cars was rapidly sinking the boat. The only hope lay in deliberately casting off the fastenings of the other gondolas, and rolling them over the fan-tailed stern!

With the deck rocking at an incredible angle, and the waves sweeping its entire length at intervals of three minutes, the odds against the crew can be appreciated. But Captain Kilty's call for volunteers met with instant response. The chains of the first car were cautiously loosened, and the huge gondola pushed down the track to the stern.

The forward wheels cleared the edge, but the body descended with a crash to the deck and hung suspended. Even the next wall of waves failed to move it. As the water receded, the men threw themselves with the fury of desperation into the task of dislodging the car's ponderous bulk. Muscles strained over crowbars with a strength which never could have been exerted under normal circumstances. But it was a fight for life! With a final reluctant sway, the car toppled to the stern's edge—hung again for a heart-straining second—and then disappeared into the foaming waters.

Hung Over Edge into Water.

The danger was passed, but only for the moment. With each of the remaining cars the ordeal was repeated. It was comparatively easy to force the front wheels to the edge, but the weight of the car was such that it was invariably suspended midway. The energy of the crew seemed tireless. From one nerve-tearing tussle, they turned without a murmur to the next. Before half of the track of plunging cars had been cleared, however, it was apparent that the vessel was doomed. The majority of the passengers were placed in the life-boats.

Captain Kilty turned abruptly as the last boat was ready.

"Johnson," he ordered, "you and Murphy take the oars!"

The railroad men of the car-ferries

are also sailors in a rudimentary way. Johnson hesitated. It seemed almost like desertion. The captain repeated his order more curtly. There was nothing to do but obey. That was how Johnson escaped!

Twenty minutes later, the death-quiver shot through No. 18; her stern dropped down under the seething waves, and she sank to her place in the graveyard of the Great Lakes. It is a significant fact that when she took her last plunge, all but two of the gondolas on her car-deck had been pushed into the water! It is such slender margins that hold the issues of life and death for the car-ferry men of the Lakes.

Another stirring Lake tragedy was that of the Marquette Bessemer ferry, No. 2, in December of 1909. In the early part of the month, with one of the furious gales of Lake Erie threatening, she left Conneaut, Ohio, for her seventy-mile trip to Port Stanley, Ontario. Three days of lashing storm followed — three days with no word from the ferry and its thirty-two coal-cars.

Railroaders Frozen at the Oars.

Her sister ship, Bessemer No. 1, after sixty hours of battling with the waves, brought her cargo into port in safety—and at once started on the trail of the missing craft. A cordon of other vessels were patrolling the lake from Conneaut to Buffalo. The car-ferry was not the only boat overdue.

A dozen others were missing, as a grim aftermath of the storm.

Gradually hope for the ferry was abandoned, but the disappointed searchers still clung to the forlorn chance that the crew had escaped in the life-boats.

On December 12, the Pennsylvania State fisheries tug, Commodore Perry, churned her way out of Erie harbor on a final quest. Suddenly off against the gray horizon, a bobbing green speck was sighted through the glasses. Slowly it developed into the outlines of a yawl. Above its water-line appeared the name of the missing car-ferry

As the Commodore Perry approached, the forms of nine men were distinguished sitting grimly erect, several with their hands still gripping the motionless oars. A hoarse voice shot across the water toward them through the speaking-trumpet of the Commodore Perry. There was no answer, although they were within easy speaking range. It was apparent that the occupants of the drifting yawl were making absolutely no effort to intercept the tug. They retained the stolidly erect positions in which they had first been sighted.

Tried to Call Dead to Life.

The Commodore Perry swerved her course squarely before the bow of the smaller boat. Still the nine men made no sign. The master of the tug raised his speaking tube impatiently.

"Hello, down there, you idiots! Can't you see—"

The trumpet dropped from his hands. He was speaking to the dead.

The drifting yawl was a funeral-boat. Her occupants were frozen solidly to the craft in which they had made their last, despairing struggle for life.

As the Commodore Perry bore into Erie harbor, with her ghastly charge in tow, I was one of the horror-numbed crowd pressed about the dock-front. The men from the foundered car-ferry had not been disturbed. As a matter of fact, it required hours to remove their bodies from the grip of ice. There was nothing of the repellent shock, however, which one might have expected in a view of such a death-cargo. The flush of health still glowed on the faces of the men. Several lay with their hands under their heads, staring up at the pitiless winter sky.

There was only one detail suggesting the last ghastly hours that they had faced on the storm-driven lake. In the bow of the boat was a little heap of clothing — overalls, jumper, overcoat. Every one of the occupants of the craft was completely attired.

Ashley Proves a Prediction.

The only explanation of the extra garments was that ten men had occupied the boat, and that one of the number, crazed by the exposure and suffering, had flung off his clothes and sought a suicide's death in the water.

Of the car-ferry, no other signs were ever brought to shore. The story of her

last struggle is another of the mysteries of the Great Lakes. Whether in the fury of the gale, her freight-cars were torn from their anchors, and battered her to destruction, will never be known. It is, of course, the logical explanation.

A struggling engineer—a railroad man of the West, with all of the virile enthusiasm of the West—once sent a frantic message for financial aid to the Astors. He was building the Toledo and Ann Arbor Railroad, and his optimism painted glowing returns from the enterprise. The Astors sent back a curt refusal, the bald effect of which was: "You're crazy! How are you going to run a train across Lake Michigan—tunnel it or bridge it?"

"I am trying to do both!" he answered.

The engineer was J. B. Ashley, and the railroad world to-day counts the Toledo and Ann Arbor line of his construction one of the greatest engineering successes of the United States. He carries his trains across Lake Michigan on every day in the year. Wonderful as it may seem, he has made good his prediction of both tunneling and bridging. In other words, he has constructed a three-hundred-and-fifty-foot "floating" tunnel of steel, capable of holding a train of thirty-two cars, and making the sixty to one hundred mile passage across Lake Michigan through two feet of ice.

"Ice demons" the railroad men of the Great Lakes call Ashley's steel car-ferries. If you are sufficiently adventurous, you can take passage on one of them any day in the winter, with the lake frozen ahead of you, and can count on an average speed of eight miles an hour until you make the other shore.

Battle of Steel and Ice.

Imagine a twin-screw steamer of from three hundred to four hundred feet in length. Five thousand tons of steel plates have gone into the making of her hull. Below her upper deck, you will search in vain for a sign of wood. Even the flooring of her upper deck is of naked steel. Between this impregnable steel covering, a veritable tunnel, stretches a double railroad-track. On this track are clamped thirty-two freight-cars, loaded to capacity.

On the upper deck, you can see that the ice extends on all sides, in huge, flat floes. Perhaps these will grind together with a sullen roar, and you will see hard, white ice-ridges piled up to a height of maybe twenty feet above the water. You shake your head dubiously. For a boat to attempt a passage across the frozen lake seems absurd.

The captain, however, smiles confidently. The achievements of the car-ferries are an old story to him.

Out into the harbor the vessel churns, shaping an undaunted course into the thick of the ice-packs. And now you can see more details of her curious construction. Her hull throughout is made of steel plates, seven-eighths of an inch thick. At every assailable point in the neighborhood of her water line these plates are doubled, and reenforced by steel beams.

Forcing Her Way Through Floe.

Even this protection is not sufficient. A three-foot layer of cement concrete has been built about her stern, and for a distance along her keel. The only openings in the hull, the deadlights, eight inches wide, and made of glass one-inch thick, are covered with heavy iron castings. Her designer has builded with an alert eye on the menace of the ice.

Man's ingenuity, however, has not yet been exhausted in her construction. Her bows are wreathed in swirling steam from long hoses of boiling water, attached to her boilers, and the ice, crusting about her sides and already beginning "to hold her down by the head," is melted into foaming rivulets.

Fairly cleared of the ice-crust, the ferry begins to show her heels. In the most adverse conditions, she has demonstrated a speed of eight miles an hour, and has even attained fourteen miles when the lake, in a measure, has been clear.

Suddenly a tense breath of excitement thrills through the vessel. It is as though every member of the crew is mentally bracing himself for a shock. And then it comes.

The white ice of the first encircling windrow crashes against the bow. The blow is so great that the heavy hull thrums like a guitar hurled to the floor.

Her curiously sloping stern, designed for just such contact, shoots upward and then downward. The ice-floe is shattered as by a pile-driver, and jagged lumps swirl through the air in a shower of fine needlelike slivers. The boat's twelve-foot propeller is churning the open water, the vessel grinds onward with the doggedness of a football player hurtling into an opposing line—and then she comes to a quivering, gasping pause. Her momentum has been exhausted. Into the solid field of ice she has forced her way nearly two hundred feet.

Boats Defy Frigid Tempests.

The Ashley steel car-ferries are man-made marvels of thrilling possibilities. Fancy a 3,000-ton boat, with a cargo of 2,000 tons, crunching her way through an ice-field of one hundred miles. And yet car-ferry trips have been common during the past two winters on Lake Michigan, where the crew never sighted really open water.

If you journey farther northward to the Straits of Mackinac, you will be dazed even more. Here the two veteran ferries are the St. Ignace and the Ste. Marie. The Mackinac Straits in their winter tempests rival the polar seas. From Lake Huron on the south and east and Lake Michigan on the west, heavy floes are hurled into the channel in a grinding fury, crashing together until they sometimes rise thirty feet above the surface, and often extending down a distance of one hundred and fifty feet below the water-line.

The question of maintaining an all-winter channel against these odds was the problem that confronted Ashley. Many an engineer would have given up in despair. But Ashley was daring. He conquered the ice first with his car-ferries of white oak and steel-covered hulls, later substituting his more elaborate steel types. And so thorough was his success that Rear-Admiral Makaroff, of the Russian navy, copied his design almost without change for use on the Baltic Sea and Lake Baikal—two of the most tenaciously ice-bound bodies of water in the world.

With a background like this, it is easy to imagine that the men of the ice car-ferries live in an atmosphere of constant hazard and adventure. Curiously enough, the ice-fields both increase and lesson the dangers faced by the ferries of the open lake.

Faced Starvation in Ice-Fields.

In the winter of 1910 Pere Marquette No. 1 was disabled by the impact of heavy floes off Green Island. It was evident that without assistance her condition was helpless. The ice-breaker, Algomah, was despatched to her aid, but a sudden drop in the temperature increased the number and force of the surrounding floes to such an extent that the rescuing boat also was disabled. From early in February to the middle of April, the two vessels were as completely marooned in the ice as any Arctic exploring craft in the polar seas. The provisions of the crews, of course, were soon exhausted, for the usual trip of the lake ferries is so short that a pretentious larder is not carried.

It was necessary to drive live cattle from the shore over the ice-field and butcher them at the ships. The trip over the frozen lake was one of extreme hazard, because of treacherous air-holes and the constantly shifting action of the imprisoned current, but it offered the only hope of food. The ice which had caused the disaster provided the means of salvation.

The same expedient of cattle-driving was adopted when the ice-field off Manitowac, Michigan, caught the Ann Arbor ferries, No. 1 and No. 3, in the same winter. In spite of the dubiousness of their situations, however, the men considered themselves lucky. When the Michigan, a wooden boat, was marooned in the ice of 1909, under similar circumstances, her month's imprisonment was followed by utter destruction. As the ice-field broke, the huge, churning fragments literally ground her to pieces.

Opportunity is an extra and you must know the markers.

Observations of a Country Station-Agent.

BY J. E. SMITH.

No. 53.—Meeting All Manner of Miscellaneous and Unassorted Humanity Makes the Freight Clerk an Expert in Judging Bothersome Boobs.

N this sad or glad old world, everything depends entirely on how your carbureter is working. [Anatomical note: The carbureter is located in "the middle right-hand section" and is often vulgarly called the "liver."] Beginning again. In this sad or glad old world there are groans or smiles, just as the mixture is thin or rich, foul or right. Gladness or gloom is the pit-a-pat of the motor or the squeak of an ill-adjusted machine and the carbureter is the first thing to look into as the source of all our moods.

The regular fee for an expert diagnosis of this kind is five dollars; but as the writer does not particularly need the money and has no license, the reader may take his time to passing it over.

Seeing seemly things and having wholesome thoughts, are matters largely of physical well-being. That is what I tried to say in the first paragraph, when I injected the "in'ards" of a motor car by way of illustration.

I wanted to introduce the idea, the basic thought, the fundamental theory that wherever a man has his work and existence, and with whatever drudge there is upon him or monotony surrounding him, hope and pleasure exist if he radiates these qualities himself.

This bit of reflection was brought about by a remark made to me by a freight-house man that "nothing of interest ever occurs about a freight-house, and wherein there was naught but a deadly routine, a continuous sameness of faces, figures, and facts."

I took issue with my friend in this way:

That while every man must apply himself closely to some detail to live, the real pleasures he gathers are in the little happenings, the inconsequential incidents, the mere trifles in the passing panorama about him and not in the entertainment and blessings that he hopes for after a bit. The ability to see and hear and appreciate the smallest things about us, makes our lives worth living, provided always that the aforesaid carbureter is working well.

It is quite true that a railroad freight-office, by reason of its direct dealing with the public through transfer and drayage concerns and its prosaic figures and rigid accounting, hasn't many sensations to offer.

Nevertheless, among the barrels and boxes and bundles and bills of lading and expense bills and way-bills, there runs in and out, like the thread of a fabric, the little play of human emotions worthy their place in railroad literature.

The public thinks of a railroad only in terms of passenger-service; but the real pabulum that keeps the two rails on the ties and pays the men and the divi-

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dends is gathered in through the dingy, unornamented structure behind a row of trap cars. It is known as the freight-house.

But with all the solidity and grind and limitations, so far as the general public is concerned, things happen about a freight-house that bring a smile and spice the life of those who toil day by day behind the counter.

I wish to insist on this broad principle. In dealing with people, miscellaneous and unassorted, there are as many smiles as frowns, provided, as stated in the opening paragraph, the carbureter is working well. And you, Mr. Freight-House Clerk in particular, there is as much material for your pleasure in dealing with the public as there is for feeding the perennial grouch that you may unfortunately have.

Would this annoy or amuse you?

A serious-faced man came into our office one day in quest of information. He wanted the rates on apples in crates, barrels, bulk, car load, and less than car-load to fifteen or twenty populous centers in various parts of our great domain.

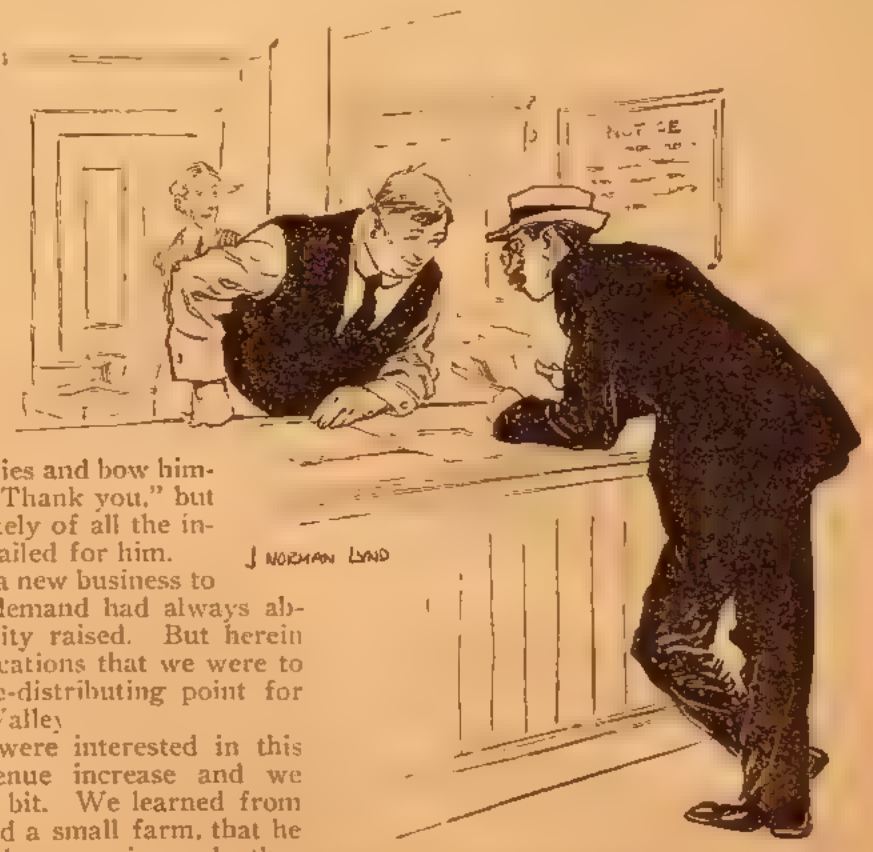
He was particular to learn all about our refrigerator-service and the rules relating to car detention. He did not talk on a few generalities and bow himself out with a "Thank you," but made notes minutely of all the information we detailed for him.

The apple was a new business to us, as the local demand had always absorbed the quantity raised. But herein were sudden indications that we were to become the apple-distributing point for the whole Ohio Valley.

Naturally we were interested in this prospect of revenue increase and we questioned him a bit. We learned from him that he owned a small farm, that he had tried sheep, hogs, grain, and other standard products with only indifferent success. All at once the apple proposition hit him and that brought him to us. He was planning to put out a forty-acre orchard. When we dug up the rates for him, bulk and otherwise, to all the marts of trade, he had not so much as put out a single sprout.

I never knew of a longer shot for prospective business than that, for an apple-tree requires years to become a productive bearer. When a man comes for the freight-rates and all shipping conditions on stuff that he cannot handle for years to come, he has a remarkable genius for foresight or is somewhat visionary, to say the least.

The point is that no one in our office begrudged him the time or pains of extracting the information for him. It passed a chuckle around. Ever since that episode all business we scent that does not subsequently materialize, is designated as a "rambow" prospect. That has a delusive sound like "rainbow," but refers particularly to the one



THE VISIONARY WAS PLANNING AN ORCHARD AND WANTED RATES ON APPLES

particular apple mentioned by our hopeful patron in barrels, crates, and bulk before he had his first twig.

An old, unkempt gent took up a freight-bill at the counter, and the delivery clerk with a "lively there" air shoved over the office end of the expense bill with the usual command, "Sign there."

The old man recoiled a bit at the prospect of signing his name. He attempted to beg off, claiming the usual excuse that he hadn't his glasses and "that he couldn't write very well anyway."

"Got to have it," interposed the clerk.

"My full name?"

"Yes, full name," responded the clerk.

The old man took the proffered pencil, unlimbered his arm and back muscles, lubricated the pencil point with his tongue, and went to the task like a sculptor carving letters in stone.

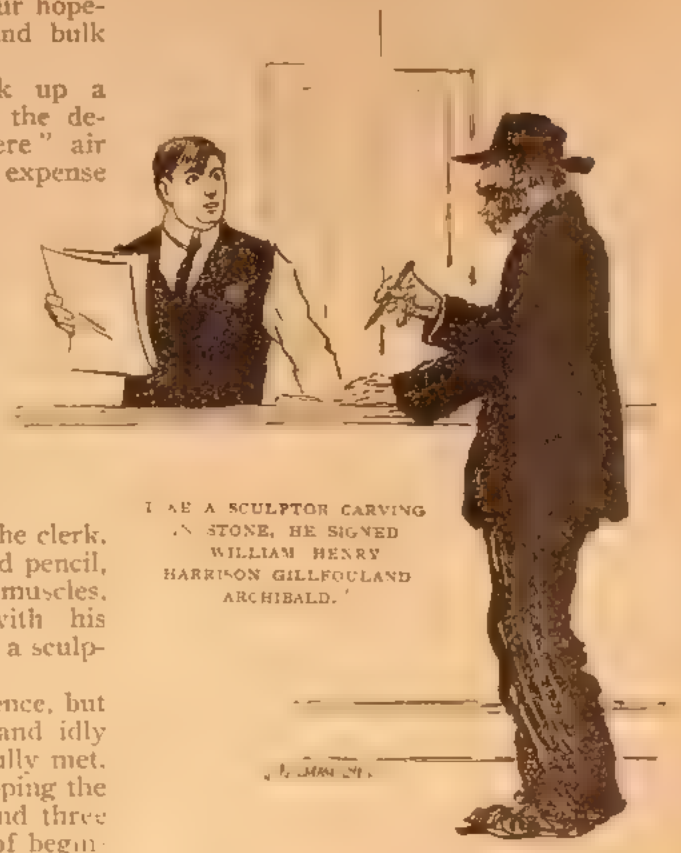
The clerk fumed with impatience, but there was nothing to do but stand idly by until the requirement was fully met. The signature ran its course, looping the loop and passing the grand stand three times until it reached the place of beginning, which the clerk had indicated by a pencil mark. It was translated to read:

"William Henry Harrison Gillfouland Archibald."

All took a look at the signature and agreed that the clerk who unnecessarily demanded it in full got what was coming to him. We knew the name was Archibald, but we think the old man added the minarets and *porte-cochères* to put one over on the waiting clerk for his rather impatient "in full."

The matter of a patron's signature recalls another instance where a man appeared at our freight-house door with a bag of cabbage for shipment to a nearby town. The freight-house man accepting the shipment, made out a bill of lading and presented it for the shipper's signature.

Now, the transaction of shipping a bag of cabbage presents no serious aspects, no matter what may happen to it, taking into full consideration especially that it is full, flat-head Dutch variety. It cannot involve one into any difficulty beyond easy extrication.



But when the shipper's signature was requested on the shipping order, he raised a protesting hand and said "No, sir, I make it a rule never to sign any papers without knowing exactly what I am signing."

"You haft to sign the shipping order!" bluntly insisted the freight-house man. "Everybody has to do that what ships anything."

"What does it say?" demanded the patron.

"Why, that you are the shipper—and that it goes to John Jones, Sheldon, Ill."

"What else?"

"That's about all."

"What's all that printing on the back and on the front of it?"

"Them's conditions."

"What conditions?"

The freight-house man gave it up in disgust. He had never read the conditions under which a transportation company undertakes to receive and transport freight. He knew there was a lot of fine-type paragraphs both on the face and

the back of the shipping order and a bill of lading, but he had never read them and had never known any one who had.

"Where's the head man here?" demanded the cabbage exporter, when he saw the freight-house man could explain nothing.

The freight-house man cheerfully passes the protesting patron into the office and over to the chief clerk.

We freight-house laborers are particularly skilled in passing anything that is knotty or obnoxious over and along to some one else in the office.

"I want to know what I am signing," explained the patron, waving the unsigned document with a sort of question-mark hyperbola, in the general direction of the chief clerk.

"That is only a printed form," blandly explained the chief clerk. "All the standard, uniform bills of lading have those printed conditions. All shippers sign shipping orders without question."

"Well, here's one that don't!" exclaimed the man with the "old-guard" finality

"Very odd," replied the chief clerk. "I never heard the provisions protested before. Men who make dozens of shipments daily, sign without a word."

"When I sign anything, when I put my name to any piece of paper, I am going to know every word that stands above it or below it, or on the underside of it! Ain't that business, now?"

The chief clerk acknowledged that it looked fair enough.

"All I ask is to know what I am signing."

This led the chief clerk to suggest that he take the document and go out where the light was best and go over it word for word, sentence by sentence, and paragraph by paragraph until he had full knowledge of every hidden corporate conspiracy that might be contained therein as affecting the life or interests of a plain citizen seeking to ship one bag of cabbages.

Finally the irascible shipper asked the chief clerk for modifications. He objected particularly to waiving responsibility for particular time delivery. While cabbage is neither explosive under confinement nor likely to deteriorate in quality within a reasonable number of days from the period of its soundness, yet the broad general principle of the railroad being permitted to take its time to move the shipment did not suit him. He asked to have that clause stricken out.

The chief clerk had to advise him that no one in the office was empowered to take any liberties whatever with the printed conditions, that either his signature must appear thereon subscribing to everything indicated or he could reload the cabbage and trail back home along the R. F. D.

He signed under verbal protest.

Note the caprices of fate. The bag was properly marked, properly billed, properly loaded—but it never arrived.

The tag may have become detached, but, at any rate, it went astray. It may have found a dark corner in some strange freight-house, or some in-between grocer may have checked over with his produce, "one bag of cabbage," and forgot to speak up.

For many months lamentations, denunciations, and maledictions were heaped upon the transportation organizations by the shipper.

The chief clerk advised settlement by claim, but the indignation at having assented with his written signature to the conditions, one of which was to waive time limitations on delivery, seemed to him to remove all recourse, so he sat on his haunches and howled.

How many outrages are answered in yelping protest, fury, and noise instead of a calm attempt to rectify!

We learned that once upon a time the man who shipped the cabbage, who insisted on reading all the conditions and altering those that did not suit him before appending his name — that once upon a time an itinerant salesman sold him a new thing in the way of a hay hoister, for which he contracted in writing.

He turned out to be a district agent for the hoister and received a car-load of them, for all of which he was duly bound, having so nominated it in the bond over his personal signature carelessly given.

He resolved never to bequeath another signature without a look. That was the reason he was at such pains to see what our form of shipping order might do to him. His suspicions and extraordinary

effort to play safe, together with the loss of the cabbage, actually cast a rift of sunshine in the darkness of the freight-house office.

We have a suspicion that the freight-house man, who in disgust turned the shipper over to the chief clerk, could offer further testimony as to the disappearance of the cabbage if he would—but he won't!

Mark that sinister look on him! Note that villainous brow! Observe those narrow eyes! Get that krauty expression! Can there be any further question where the cabbage went?

We have seasoned shippers with batting averages above .300 who add their little mite to our gaiety.

Our Mr. B ships building supplies quite extensively.

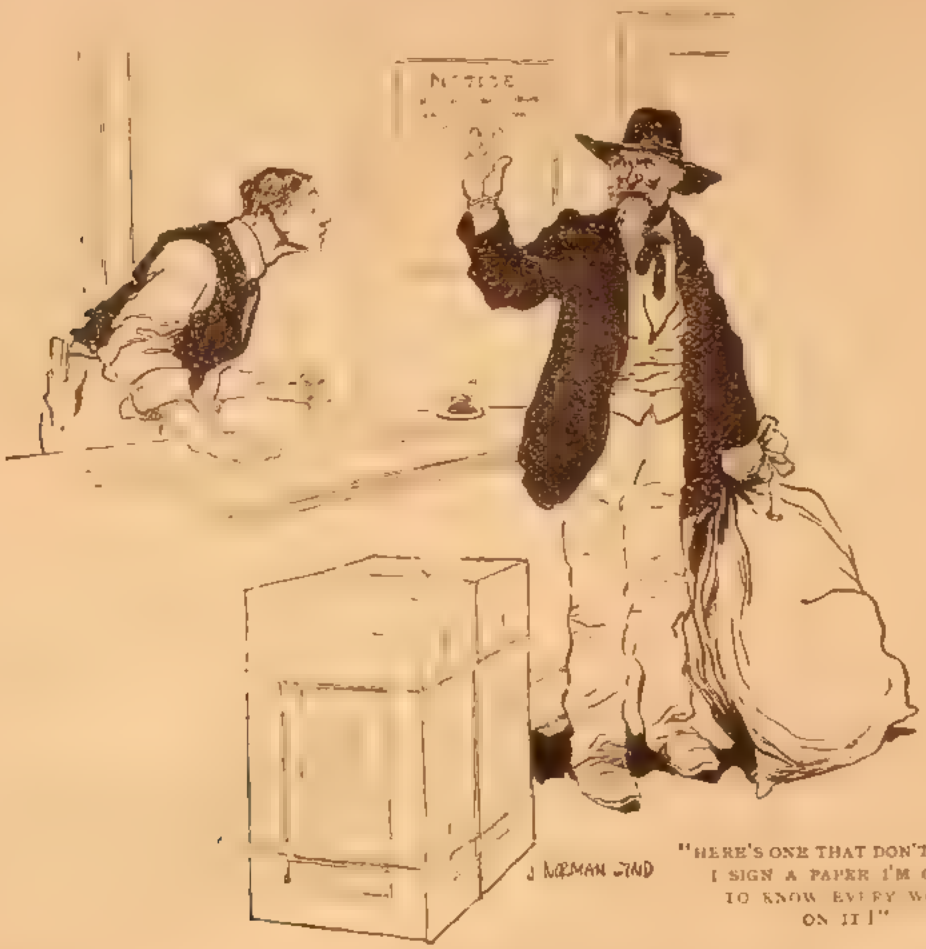
The only unusual thing about B is, that he wants everything he puts out "wire-traced and rushed." He appears to have a child's faith in the hocus-pocus of a tracer. He asks for it automatically, like returning thanks and "howdy." He shipped a car-load into an adjoining State and he sent a note to "rush it through and put a wire-tracer after it."

It chanced that we got it out without delay. We "preference-stickered" it and sent a message to the junction point to keep it going until it began to smoke.

It got through on a keen jump. It equaled Paul Revere from the church tower to Middlesex.

The car got to destination ten days ahead of the date for which it was ordered, before the consignee was ready for it. It accumulated ten dollars' worth of car-service, which the consignee promptly charged up to the shipper.

This brought the shipper to us to get his money back, but we had misplaced



"HERE'S ONE THAT DON'T. WHEN I SIGN A PAPER I'M GOING TO KNOW EVERY WORD ON IT!"

the combination to the safe. Down deep in the undercurrent of office feeling, there was a secret joy that the "wire-tracer" had gotten in its work so well. You will never convince this man that a wire-tracer is a myth.

Another valued person, a certain lumber dealer, had the habit of refusing material that came to him on various pretexts. He was constantly causing us additional work in the office and particular watchfulness in handling his business.

It was the lumberman's plan of sharp practise to turn down a consignment on account of quality, then compromise with the shipper and finally accept it at a reduced figure.

There came one day a car of white-cedar shingles which he promptly rejected as of inferior quality. The office made full report of the facts and the lumber dealer coolly awaited the usual concession in price. There were letters and telegrams between shipper and consignee. The shipper insisted the car was the best quality, the consignee claimed otherwise.

The dickering for advantage went on for several days, and we held the loaded car awaiting the outcome.

One day two men in the apparent garb of agriculture drove in to submit a bill of lumber for the lumberman to figure on. It was a big bill, and the men found in stock what they wanted and appeared well satisfied both with quality and price.

The bill specified a number of thousand white-cedar shingles, the last article considered. The man buying the stock did not like the shingles in the lumberman's stock. He wanted a particular white-cedar shingle and he was so determined on that specification that it looked as if the lumberman might lose a big bill by not having the shingles indicated.

"I have it," exclaimed the lumberman with a sudden inspiration. "The railroad has just notified me that there is a car of white cedar just in, standing on the siding this very minute."

They went down into the yard where the car was stored and opened the door.

"You can't beat 'em," enthusiastically urged the lumberman. "Here they are. The very thing you want. Extra star; A star."

"I don't want anything else palmed off on me," said the buyer. "The architect told me to look out or I would get No. 1 or Standards. Star, A Star is what the bill calls for."

The lumberman made the strongest claim for the shingles; but the buyer urged all the objections against them that the lumberman had in refusing them, such as lack of full lengths, feathered edges, shaky, and narrow.

At length the lumberman convinced the buyer that they were exceptionally clear, clean stock, in every way up to the grade demanded.

Unsuspectingly the lumberman allowed himself to be led into the freight-office. Unexpectedly he was adroitly led to reiterate in the hearing of the agent what he had urged as to the superior quality of the product.

"Then you had better receive this car from the railroad," said the alleged farmer. "I haven't told you I intended to buy a bill of lumber. I was looking over your stock and getting prices. I may as well let you know I represent the firm that sold you this car of shingles. Since you insist they are the best that can be turned out, I don't see that there is anything else for you to do but take them off the railroad's hands."

He did; because they had him cinched on his own testimony and approval.

Of course, he tried to get the railroad to concede the accumulated car-service, but it had to stick. The whole trick was so neatly turned on him that more than a grin went round the office.. It was a full-blown roar.

There is that universal propensity among us rogues, no matter how shady the tricks we are wont to put over ourselves, to secretly exult when a brother rogue is outwitted. Every rogue is glad to see the other rogue get his. So we all snickered when our esteemed patron took up his freight-bill with the car-service bill up to the last minute attached thereto.

Now and then even the dead things about the freight-house come in combinations that startle and amuse.

An ambitious young physician rented an office in our town and ordered a complete outfit of chairs, cabinets, tables, cases, etc. The shipment came in and was set out in a way-car on our team-track. The car contained a number of

shipments for our station which our check-clerk found to consist of:

The young doctor's office outfit.
A consignment of fresh flowers for a flower man.
A shipment of burial caskets for an undertaking establishment.
Some granite monuments for a tombstone dealer
Nothing else.

Did any freight-house man ever open a way-car on a neater combination? The doctor, the flowers, the casket, the monument. Hard to beat that line of credentials and recommendations for a young physician just starting.

Freight-house men and local freight-crews often find pleasure in the mere handling of freight. For example, loading or unloading flour is uproarious sport.

The game is to form a line and the sacks are pitched from one to another, commencing in the car and ending in the freight-house, or *vice versa*.

It is great play. The game is to crowd some weaker link faster than he can handle the sacks, so that he drops one occasionally. If he is adjusted for a twenty-five-pound sack, to unexpectedly deliver to him one weighing fifty pounds. This knocks him off his underpinnings, twists his spine, wallops his diaphragm around the transverse colon, and he drops the sack.

The extent of the hilarity depends on how many sacks he drops, bursts, and musses up. Of course the company, in the end, settles with the consignee for his loss; but what has that to do with real live pastime?

Why, if two or more boxes, barrels, or packages are shipped, and one of them is lost, it invariably contains the high quality stuff. It is the most valuable of them all. The cheaper articles always get through. The package containing the silver, silk, or the cut glass is the one that evaporates. If a patron "checks short" one piece of the lot, depend upon it, that piece contains the expensive materials of the whole invoice. It does not just happen that way. It is the work of the railroad jinx.

Every railroad freight-house has a shipper who brings a barrel of apples in the fall, a dressed hog in the winter, and a bag of seed corn in the spring, whereupon he calls attention to the great business he is doing with the railroad and puffs up as a prized and valued patron.

More and more the cry of rush and the demand for special movement assails the ear of the freight-house man. Everywhere private families are purchasing at department concerns, and the inquiries and complications of these new transactions are unloaded on the freight-office.

The baby, the boy, the miss, the father, the mother, grandma, and grandpa telephone in turn. From early morn to dewy eve, every time there is a whistle of a passing engine, some member rings up the freight-house to know if the box that was shipped out of Buffalo "day before yesterday hasn't come in?"

"Day before yesterday" in Buffalo means to-day in Ohio, Missouri, or South Dakota. Distance and transfer terminals are no object. Every one is hurried and worried and with a vague idea that the legerdemain of freight transportation should carry a shipment anywhere in two days.

A German unloaded a box into our freight-house and wiped his brow.

"He's deat," said he solemnly to the freight-house man.

"Dead?" echoed the clerk.

"Yah! He's deat! We send him to Iowa."

"We can't handle a corpse in that way," exclaimed the freight-house man, aghast.

"Dot ain't him," exclaimed the German. "Haw! Haw! That's a goot joke on you! This is his clothes und books und things. We send to his boy at Marshalltown."

"Oh, I see, a box of effects."

"You get him out by yesterday, huh?"

"Yes; it's gone to-morrow."

"Huh? Vell, he get it to-day, maybe. You put a tracer after him?"

"Better consult the clergy about that."

"I hear if you put a tracer after him it rush him through."

It takes more imagination than our freight-house man possessed to understand why a tracer should pursue a dead man's belongings. He dully reasoned it out that as the son had gone through all the years without the trappings in question, the matter of a few days in delivery was of no particular concern.

The German had the idea of a tracer, just because "everybody's doin' it!"

We received one day a sewing-machine for Susan Blinker, crated in rough boards, with the superstructure wrapped in rag-carpet. It wasn't a "factory to buyer" machine, but an old family treasure that aunt was sending from Herkimer County. When it arrived a leg was broken. The way-bill bore the notation. "Found broken at Buffalo Transfer. Ditto at Columbus."

It had been crated by one inexperienced and had play enough inside to break its shins, ribs, or cranium in the jerk and jar of box car transportation.

Susan was notified. She appeared at our counter in person. She gasped in horror on finding that a leg of the machine was broken, then she stiffened and said sternly:

"What are you going to do about it?"

We explained that she should accept the machine with expense bill noted, "leg broken," and then file with us a claim for cost of a new casting together with the expense of putting it on.

People cannot well understand the general circumlocution of claim papers and the delays incident thereto. There is a general impression that an agent can produce the wherewithal on the spot and liquidate without the trifling preliminary of having the claim office investigate.

"It will cost five dollars to get a new casting," snapped Susan.

"Very likely," we acquiesced in our suavest manner.

"Well?"

"You will have to file your claim."

"Can't you see that it's broke? Ain't that file enough?"

"But you must make a bill against us. Pin your expense bill and the original bill-lading to it—"

"You don't need anything," Susan broke in abruptly. "It's broke! You know it's broke! You acknowledge it's broke, and you broke it! I want pay for it right now!"

"IT'S BROKE, AND YOU BROKE IT. PAY FOR IT RIGHT NOW," SNAPPED SUSAN.

Again we explained that it was impossible for us to pay on the spur of the moment and again indicated to her the best course for her to pursue.

"Then I'll leave the machine on your hands!" hotly retorted Susan.

There is a crude impression abroad that when you leave it "on the railroad's hands" you have played the master stroke, hurled the king-bolt, cast the die, or whatever it is that indicates that you have put across something vital.

Susan swished out and an awkward young man came in.

"The sewing-machine," said he tentatively. "How long will it take to get the pay for it if she puts in a claim?"

We made a guess. "Thirty, sixty, or ninety days."

He backed out and joined Susan at the buggy. They had driven in together. After a conference he returned.

"Ain't there any way it could be paid sooner?" he asked.

We assured him there was not.

He went out and argued with the woman. She shook her head, then her fist at the freight-office.

The young man once more returned and stuck his head in the door.

"She says she's goin' to leave it on your hands until you pay for it!" he called out and they drove away.

We trucked the crippled sewing-machine into the corner of the freight-house consecrated to the infirm, the homeless, and the derelict, and made the usual "damage and refused" reports.

At the end of a week, Susan reappeared to know if we now had enough and were ready to hand over.

The same awkward young man was with her. He thought she should do as we said and take the machine out and settle afterward; but to Susan's mind the short cut to justice was to "leave it on our hands" until we yelled enough.

At regular and repeated intervals the woman appeared to learn the effect of her drastic action in "leaving it on our hands."

She thought the strain would soon tell on us. Each time the awkward young man was with her. He appeared less triumphant and more concerned. Each time he argued with the woman and tried to hit on some plan for getting the machine out; but she was the most obdurate claimant our office had ever encountered.

There was a deadlock. It looked like night sessions and into the summer. Nothing could move the woman from her purpose. The machine was on our hands.

The awkward young man was troubled. He tried in every way, but he could not conciliate the factions. Encumbered and oppressed as we were with the machine "on our hands," we still insisted on observing certain rules. This strained relationship and high tension went on for two months, when one day the woman appeared in a rather jubilant and exultant mood and took the machine away.

We did not question her, although we were at a loss to know why she changed her mind so suddenly and with such an air of triumph. In time it came out.

The awkward young man was to wed the daughter of the woman. The date was fixed. An old auntie forwarded a sewing-machine so all the bride's wedding garments could be made at home.

Then the railroad broke the machine and preparations came to a halt pending adjustment of damages. The situation resolved itself into—no machine, no slyly made wedding garments, no wedding.

The awkward young man got very anxious and the prospective mother-in-law's rigid idea of right threatened delay. She held steadfast on the matter of principle and, as our office could do nothing further, it began to look to the young man as if possession of the fair Juliet would have to go over until after harvest.

In desperation he told our freight-house man of his dilemma.

"I wouldn't have had this happen for fifty dollars," he gulped.

"You wouldn't?" asked the freight-house man sympathetically.

"Not for a hundred. No, not for the best horse I got on the place!"

"I'll tell you, old top," said the freight-house man with a flow of fellow-feeling, "why don't you settle it and get the wheels to turning?"

"I can't. She won't let me. She's the stubbornest woman—"

"Slip me five dollars," said the freight-house man. "I can fix her. Bring her in and I'll settle with her. She will never know but that the railroad is paying it."

The awkward young man was delighted with this simple plan. He passed over the five, went directly for Susan Blinker, who returned with him, and the machine was taken "off our hands."

At the appointed time—somewhere between laying away the corn and plowing for winter wheat—the awkward young man married the girl. While in the silence of the country no wedding-bells may have rung, here's hoping the meadow-lark made much ado.

THE OLDEST FREIGHT DEPOT IN THE WORLD. BUILT AT FREDERICKSBURG, MARYLAND, EIGHTY-ONE YEARS AGO BY THE BALTIMORE AND OHIO AND STILL IN USE

THE ROMANCE OF AMERICAN RAILROADS.

BY W. S. WRIGHT.

(PART III.)

ROSS WINANS, the inventor of the friction-wheels, first used on the Baltimore and Ohio Railroad, on August 28, 1830 wrote the following letter, giving a comparative view of the performance of the locomotive of the Stephensons, of England, contrasted with that of Peter Cooper, of the United States:

PHILIP E. THOMAS, Esq.,
President Baltimore and Ohio Railroad Company.

Sir,

The performance of the working model [illegible] Mr Cooper has been such to-day as to induce [illegible] a hasty comparison of its [illegible] performance with some of the celebrated English locomotives, having witnessed the grand locomotive exhibition at Liverpool in October last, for

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the £500 purse, and many other interesting experiments by the Novelty and Rocket since that time. As Mr. Cooper's engine has been got up in a temporary manner, and for experiment only, and has been on the road but a few days, it will be no more than justice to make the comparison with some of the early experiments of the English engines. I have, therefore, selected the experiment of the Rocket in October, on the result of which the premium of £500 was awarded to Mr. Stephenson, its builder, for having produced the most efficient locomotive-engine, etc.

The Rocket is professedly an eight-horse-power when working at a moderate speed, but, when working at high velocities, she is said to be more than eight horse-power. Its furnace is two feet wide by three feet high; the boiler is six feet long and three feet in diameter.

The furnace is outside of the boiler, and has an external casing, between which and the fireplace there is a space of three inches filled with water and communicating with the boiler. The heated air from the furnace is circulated through the boiler by means of twenty-five pipes of two inches internal diameter. It has two working cylinders of eight inches internal diameter and fifteen inches in length each, or thereabouts. The road-wheels to which the motion is communicated are four feet eight and a half inches in diameter.

Mr. Cooper's engine has but one working cylinder of three and one fourth inches diameter, and fourteen and a half inch stroke of piston, with a boiler proportionably small, or nearly so. The wheels of the engine to which the motion is communicated are two and a half feet in diameter, making it necessary to gear with wheel and pinion to get speed, by which means a considerable consumption of power is experienced.

You will perceive by the foregoing that the capacity, or number of cubic inches, contained in the cylinder of Mr. Cooper's engine is only about one-fourteenth part of that contained in the two cylinders of the Rocket; consequently, it can only use one-fourteenth the quantity of steam under the same pressure when each engine is making the same number of strokes per minute, which is nearly the case when the two engines are going at equal speed on the road.

The total weight moved in the experiment above alluded to by the Rocket, including her own weight, was seventeen tons on the level road at an average speed of twelve and a half miles the hour, thereby exhibiting (agreeably to Vignoles's late table of the power of locomotive-engines) a little less than a six-horse engine.

Mr. Cooper's engine has, to-day, moved a gross weight of four and a half tons from the depot to Ellicott's Mills, and back in the space of two hours and ten minutes, which, as you are aware, the distance being twenty-six miles, gives an average speed of twelve miles to the hour. As the engine returned with its load to the same point whence it started, the acclivities and declivities of the road were, of course, balanced; and at least as much time and power (if not more) were required to traverse the whole distance as would have been on a level road; therefore Mr. Cooper's engine exhibited an average force during the time it was running of 1.43 horse-power, or nearly one and a half, which is more than three times as much power as the Rocket exhibited during the experiment above described, in proportion to the cylindrical capacity of the respective engines.

This, no doubt, originated in a considerable degree from the steam being used in Mr. Cooper's engine at a higher pressure than in the Rocket. We are, however, not able to come to any very correct conclusion as to what extent this cause prevailed (Mr. Cooper's steam-gage not being accurately weighed), which prevents a more minute comparison being made.

It may be said that subsequent practice and experience with the Rocket have enabled her constructor to produce more favorable results, which is no doubt the case; but we have every reason to expect a similar effect with regard to Mr. Cooper's engine, judging from what we have witnessed, each exhibition of its power being, as yet, an improvement upon the one that preceded it.

It is, however, too small and too temporary in its construction to expect a great deal, from the friction of the parts; the heat lost in a small engine being much greater in proportion to the power than in a large one. But to-day's experiments must, I think, establish, beyond a doubt, the practicability of using locomotive steam-power on the Baltimore and Ohio Railroad for the conveyance of passengers and goods at such speed and with such safety (when compared with other modes) as will be perfectly satisfactory to all parties concerned, and with such economy as must be highly flattering to the interests of the company.

It has been doubted by many whether the unavoidable numerous short curves and inclined planes on the line of your road would not render the use of locomotive power impracticable; but the velocity with which we have been propelled to-day by steam-power round some of the shortest curves—from fifteen to eighteen miles per hour—without the slightest appearance of danger, and with very little, if any, increased resistance, as there was no appreciable falling off in the rate of speed, and the slight diminution in speed in passing up the inclined planes, some of which were nearly twenty feet to the mile, must, I think, put an end to such doubts, and at once show the capability of the Baltimore and Ohio Railroad to do much more than was at first anticipated or promised by its projectors and supporters.

Respectfully yours,

Ross Winans.

An interesting description of the first trip of Peter Cooper's locomotive was written at the time by H. B. Latrobe, generally attorney for the B. and O. He was one of the passengers on that occasion. In a lecture before the Maryland Institute, in 1868, Mr. Latrobe, speaking of the numerous curves that existed on the line of the Baltimore and Ohio Railroad, said:

> For a brief season it was believed that this feature of the early American roads would prevent the use of locomotive-engines. The contrary was demonstrated by a gentleman still living in an active and ripe old age, honored and beloved, distinguished for his private worth and for his public benefactions; one of those for whom wealth seems to have been granted by Providence that men might know how wealth might be used to benefit one's fellow creatures. I refer to Mr. Peter Cooper, of New York.

Mr. Cooper was satisfied that steam might be adapted to the curved roads which he saw would be built in the United States; and he came to Baltimore, which then possessed the only one on which he could experiment to vindicate his belief, and he built an engine to demonstrate his belief.

The machine was not larger than the hand-cars used by workmen to transfer

PETER COOPER, FOUNDER OF THE COOPER INSTITUTE, NEW YORK. HE WAS ONE OF THE FIRST AMERICANS TO SEE THE POSSIBILITY OF THE RAILROAD. HE BUILT "TOM THUMB," ONE OF THE FIRST AMERICAN LOCOMOTIVES. ITS TUBES WERE OLD GUN BARRELS.

Photograph by Sarony, New York

[illegible]ves from place to place; and, as the speaker now recalls its appearance, the only wonder is, that so apparently insignificant a contrivance could ever have been regarded as competent to the smallest results.

But Mr. Cooper was wiser than many of the wisest around him. His engine could not have weighed a ton, but he saw in it a principle which the forty-ton engines of to-day have but served to develop and demonstrate.

The boiler of Mr. Cooper's engine was not as large as the kitchen boiler attached to many a range in modern mansions; it was of about the same diameter, but not much more than half as high. It stood upright in the car, and was filled above the furnace, which occupied the lower section, with vertical tubes.

The cylinder was but three and a half inches in diameter, and speed was started [illegible] gearing.

No natural draft could have been sufficient to keep up steam in so small a boiler; and Mr. Cooper used, therefore, a blower, apparatus, driven by a drum attached to one of the car-wheels, over which [illegible] a cord that in its turn worked a pulley on the shaft of the blower.

Among the first buildings erected at Mount Clare was a large car-house, in which railroad tracks were laid at right angles with the road track, communicating with the latter by a turntable, a Lilliputian affair indeed, compared with the revolving platforms, its successors, now in use.

In this car-shop, Mr. Cooper had his engine, and here steam was first raised; and it seems as though it were within the last week that the speaker saw George Brown, the treasurer of the company, one of our most estimable citizens, his father, Alexander Brown, Phillip E. Thomas, and one or two more, watch Mr. Cooper, as with his own hands he opened the throttle, admitted the steam into the cylinder, and [illegible] substitute operate [illegible] fully with a clacking noise, while the machine moved slowly forward with some of the bystanders, who had stepped upon it.

Well: this was the first locomotive for railroad purposes ever built in America; and this was the first transportation of persons by steam that had ever taken place on this side of the Atlantic, on an American-built locomotive.

Mr. Cooper's success was such as to induce him to try a trip to Ellicott's Mills, on which occasion an open car, the first used upon the road already mentioned, having been attached to the engine, and filled with the directors and some friends, the speaker among the rest, the first journey by steam in America on an American locomotive was commenced. The trip was most interesting.

The curves were passed without difficulty at a speed of fifteen miles an hour; the grades were ascended with comparative ease; the day was fine, the company in the highest spirits; and some excited gentleman of the party poked out [illegible] ramrod [illegible] books and [illegible] speed, which was eighteen miles [illegible] wrote that it was [illegible] sentences I [illegible] that [illegible] velocity it was possible [illegible]

The return trip from the Mills a distance of thirteen miles was made in fifty-[illegible] minutes. This was in the summer of [illegible] of this Tom Thumb [illegible] the first steam passenger [illegible] were Stockton and Stokes [illegible] constructed [illegible] power was [illegible] fowls, [illegible] to [illegible] that [illegible] [illegible] [illegible]

THE OLDEST LOCOMOTIVE IN THE WORLD THAT IS DAILY UNDER STEAM. IT WAS BUILT IN 1842, AND TO-DAY IS MAKING REGULAR TRIPS AT THE COLLIERIES OF SIR LINDSAY WOOD, HETTON LE HOLE DURHAM COUNTY, ENGLAND.

In those days of railroad romance, when the crude early locomotives were looked upon as mere freaks and impossible of practical development, steam had one great rival to overcome, and that was "horse" power.

A horse was placed in a car and made to walk on an endless apron or belt in order to "make the wheels go round."

The machine worked indifferently; but on one occasion, when drawing a car filled with representatives of the press, it ran into a cow, and the passengers, having been tilted out and rolled down an embankment, were unanimous in condemning the contrivance. And so the "horse" power car passed out of existence.

Next came the Meteor, a sailing vehicle. It was the invention of Evan Thomas, who was, perhaps, the first man who advocated railroads in Baltimore.

The Meteor required a good gale to drive it, and would only run when the wind was abaft or on the quarter. Head winds were fatal to it, and Mr. Thomas was afraid to trust a strong side wind lest the Meteor might upset.

Therefore, it seldom made its appearance unless the wind was from the north, when it would be dragged out to the farther end of the old Mount Clair embankment and be blown back.

The Baltimore and Ohio Railroad being the first in operation in this country, and almost the first in the world for the transportation of passengers and merchandise, was visited by people from all over the world. Among them was Baron Krudener, envoy from Russia, who by invitation of Mr. Thomas, made an excursion in the sailing-car and "sailed" it himself. On his return from the trip, he declared he had never before traveled so pleasantly.

Mr. Thomas had a model of the sailing car constructed, which he presented to Baron Krudener, with the compliments of the company, to be forwarded to the emperor. Like the horse-car, the sailing-car was soon sent to the scrap-heap. It was an amusing toy only.

It was after the demonstration by Peter Cooper that the Baltimore and Susquehanna Railroad Company imported the Herald from England.

Its greatest stunt was to run off the track. Its unfitness, with its large wheels, for use on our curved roads, was quickly apparent.

Despite its unpractical qualities, the Herald was greatly admired for its beauty. Thomas John, its "driver," was also much in the public eye. When he came down from his "lofty" perch to oil the engine, the crowd surrounded him.

Peter Cooper, like his eminent contemporary, George Stephenson, may be looked upon justly as the pioneer of the locomotive system in America. Undoubtedly he built the first locomotive ever constructed here; and although his little machine was not intended for practical purposes on a railroad, yet it established a fact then very much doubted: the ability of a locomotive to travel on curves.

But the Herald was antedated in another quarter. Mr. Cooper commenced his career in life from the very foot of the ladder, and by perseverance and industry, rose step by step until he reached the top. His life-story is the history of a poor boy, without education or influential friends, who raised himself to a position of wealth and reputation.

Mr. Cooper was born in the city of New York, February 12, 1791. His maternal grandfather, John Campbell, was mayor of New York and deputy quartermaster-general during the Revolutionary War, in which his father also served as a lieutenant.

Mr. Cooper's father was a hatter, and, as soon as young Peter was old enough to pick fur from the rabbit skins used in making hats, he was set to work.

He had no opportunities for education, and only attended school one or two months in his life.

"I have never had any time to get an education," he once almost pathetically remarked, "and all that I know I have had to pick up as I went along."

He remained in the hat business with his father until he had mastered all its branches. During much of the time, after he had finished his labors for the day, he would work until late at night with some carver's tools which his grandmother gave him, in order to add to his small wages.

The Cooper Institute in New York City is the result of his recollections of those early days of struggle, and is intended to help poor boy

Young Cooper afterward went into the brewing business, at which he remained for two years. He then served an apprenticeship at coach-making, and finally joined his brother in the cloth-shearing business.

For some time they succeeded, but after the War of 1812 the business was so injured by the introduction of foreign cloths that Peter Cooper left it and began cabinet-making.

He gave this up after a while and opened a grocery-store on the present site of the Cooper Union, New York City, where he carried on a small retail trade. He bought a woolen factory with his savings.

He was interested in other ventures, but the largest part of his fortune was made in the manufacture of glue and by his iron works.

In 1830 he erected extensive iron-works at Canton, near Baltimore, where he built from his own designs the first locomotive on this continent.

He carried on large wire and rolling mills at Trenton, New Jersey, and was the first man to roll wrought-iron beams for fireproof buildings. He was interested in the progress of telegraphy, and was an officer in several leading telegraph companies.

While serving as an alderman Mr. Cooper conceived the idea of "Cooper Union." A fellow alderman who had visited the *Ecoles d'Industrie* in Paris and been much impressed with their utility and attractions, described them to Mr. Cooper and suggested that a similar school should be started in this country. The idea remained for many years in Mr. Cooper's mind. Finally the ground was broken and the educational monument to Peter Cooper begun.

The mere saving and donating of the money for the purpose was but a fraction of the work performed. Great difficulties had to be overcome in designing the building; unique at the time, but very old-fashioned when compared with the wonderful buildings of to-day.

Mr. Cooper was determined that it should be fireproof, consequently a separate foundry had to be erected to forge the iron used in the construction. When this was done, the estimated outlay fell short twenty-five thousand dollars of the actual cost.

Countless other obstacles had to be overcome, and, finally, the institute was completed at cost far in advance of its estimated expense. In fact, it took all Mr. Cooper's money to finish it, and he was a comparatively poor man when all the bills were paid.

On the day the building was completed, February 12, 1871, Mr. Cooper reached his eightieth birthday.

The key to Mr. Cooper's life is to be found in his own words: "I resolved that I would repay every benefit which I had received by conferring an equal benefit on some of my fellow men."

The conditions required and the premium offered by the Baltimore and Ohio Railroad Company for the best locomotive of American manufacture were as follows:

OFFICE OF THE BALTIMORE AND OHIO RAILROAD COMPANY.

January 4, 1831.

The Baltimore and Ohio Railroad Company, being desirous of obtaining a supply of locomotive-engines of American manufacture, adapted to their road, the president and directors hereby give public notice that they will pay the sum of four thousand dollars for the most approved engine which shall be delivered for trial upon the road, on or before the 1st of June, 1831; and they will also pay three thousand five hundred dollars for the engine which shall be adjudged the next best, and be delivered as aforesaid, subject to the following conditions, to wit:

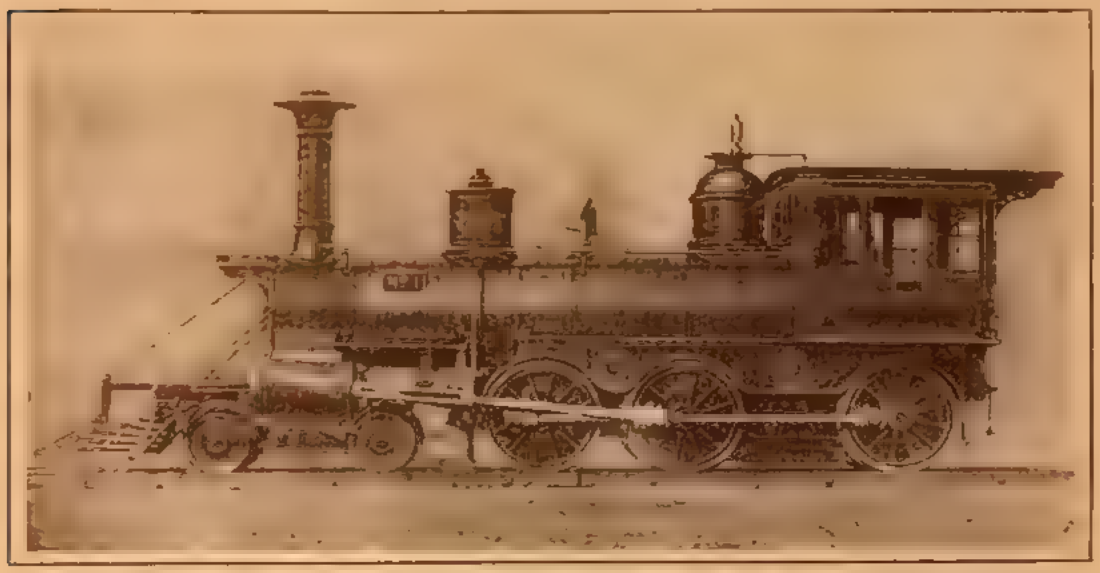
FIRST—The engine must burn coke or coal, and must consume its own smoke.

SECOND—The engine, when in operation, must not exceed three and one-half tons weight, and must, on a level road, be capable of drawing day by day, fifteen tons, inclusive of the weight of the wagons, fifteen miles per hour. The company to furnish wagons of Winan's construction, the friction of which will not exceed five pounds to the ton.

THIRD—In deciding on the relative advantages of the several engines the company will take into consideration their respective weights, power, and durability, and all other things being equal, will adjudge a preference to the engine weighing the least.

FOURTH—The flanges are to run on the inside of the rails. The form of the cone and flanges, and the tread of the wheels, must be such as are now in use on the road. If the working-parts are so connected as to work with the adhesion of all the four wheels, then all the wheels shall be of equal diameter, not to exceed three feet; but if the connection be such as to work with the adhesion of two wheels only, then those two wheels may have a diameter not exceeding four feet, and the other two wheels shall be two and a half feet in diameter, and shall work with Winan's friction-wheels, which last will be furnished upon application to the company. The flanges to be four feet seven and a half inches apart, from outside to outside. The wheels to be coupled four feet from center to center, in order to suit curves of short radius.

FIFTH—The pressure of steam not to



IN 1862 BALDWIN TURNED OUT THIS CLASSY-LOOKING ENGINE FOR THE PENNSY. HER DRIVING-WHEELS WERE 48 INCHES; CYLINDERS, 18½ × 22.

HORATIO ALLEN, THE FIRST MAN TO RUN A LOCOMOTIVE IN THE UNITED STATES. HE WAS AT THE THROTTLE OF THE "STOURBRIDGE LION" WHEN SHE MADE HER FIRST TRIP, AUGUST 8, 1829.

exceed one hundred pounds to the square inch, and, as a less pressure will be preferred, the company, in deciding on the advantages of the several engines, will take into consideration their relative degrees of pressure. The company will be at liberty to put the boiler, fire-tube, cylinder, etc., to the test of a pressure of water not exceeding three times the pressure of the steam intended to be worked, without being answerable for any damage the machine may receive in such a test.

SIXTH.—There must be two safety-valves, one of which must be completely at of reach of the engineman, and neither of which must be fastened down while the engine is working.

SEVENTH.—The engine and boiler must be supported on springs and rest on four wheels, and the height from the ground to the top of the chimney must not exceed twelve feet.

EIGHTH.—There must be a mercurial gage affixed to the machine, with an index-rod, showing the steam-pressure above fifty pounds per square inch, and constructed to blow out at one hundred and twenty pounds.

NINTH.—The engines which may appear to offer the greatest advantages will be subjected to the performance of thirty days' regular work on the road; at the end of which time, if they shall have proved durable, and continue to be capable of performing agreeably to their first exhibition, as aforesaid, they will be received and paid for as herein stipulated.

P. E. THOMAS, President.

N. B.—The railroad company will provide and will furnish a tender and a supply of water and fuel for the trial. Persons desirous of examining the road, or of obtaining more minute information, are invited to address themselves to the president of the company. The least radius of curvature of the road is four hundred feet. Competitors who arrive with their engines before the 1st of June will be allowed to make experiments on the road previous to that day.

The editors of the *National Gazette*, Philadelphia; *Commercial Advertiser*, New York, and *Pittsburgh Statesman*, will copy the above once a week, for four weeks, and forward their bills to the Baltimore and Ohio Railroad Company.

Phineas Davis's engine, better known as Davis and Gartner's engine, built at York, Pennsylvania, was the only one which came up to the requirements of the company. After a trial and several modifications and changes, late in the summer of 1831, this engine was found capable of running between Baltimore and Ellicott's Mills, thirteen miles. It hauled four loaded cars of the gross weight of fourteen tons, and made the thirteen miles in about one hour.

This engine was mounted on wheels thirty inches in diameter, and its velocity was effected by means of gearing with a spur-wheel and pinion on one of the axles of the "road wheels."

In the construction of the road from Baltimore to the Point of Rocks, everything suggested by science or experience was tested. Therefore this road had the honor of solving most of the problems which presented themselves in this early

period of railroads in this country. The granite, the iron rail, the wood and iron on stone blocks, the wood and iron on wooden sleepers, supported by broken stone; the same supported by longitudinal ground-sills in place of broken stones; the log-rail, formed of trunks of trees, worked to a surface on one side to receive the iron, and supported by wooden sleepers; and the wrought iron rails of the English mode were all tried out by the B. and O. as early as 1832.

While all this was taking place in Maryland, a similar enterprise, nearly equal in its magnitude and importance, was started in another section of the country.

The practicability of establishing a railroad communication between Charleston, South Carolina, and Hamburg, on the western border of that State, a distance of one hundred and thirty-six miles, was considered as far back as 1827.

The Charleston *Courier*, of December, 1827, published the following letter from Columbia, where the Legislature was in session at the time:

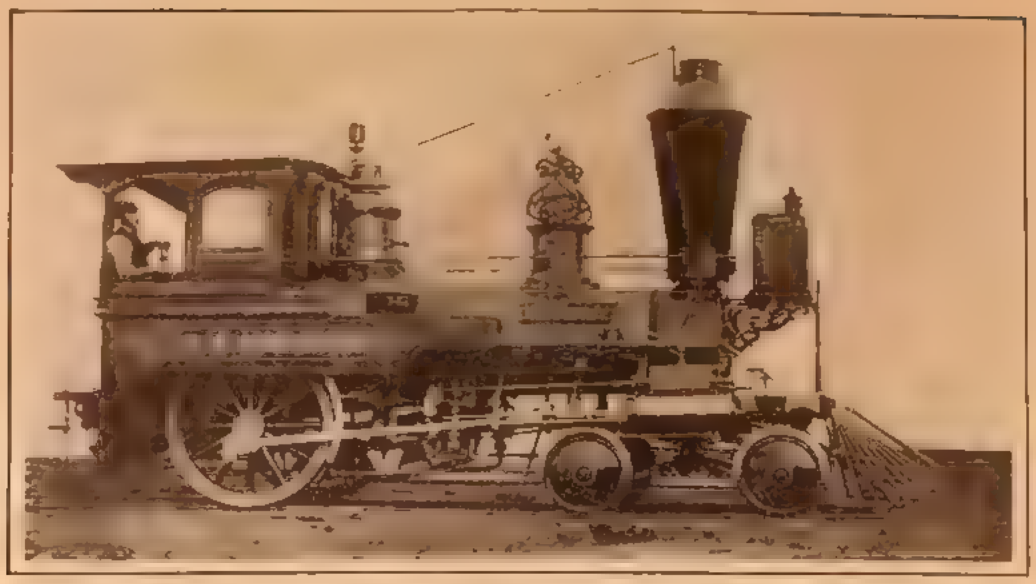
> The committee to whom the Charleston memorial was referred is divided in opinion on the propriety of an appropriation for the survey of the country between Charleston and Hamburg. Some of the committee think that if the railroad is to be the work of a company, who is to receive all the profits, the whole expense should be borne by the company. And again, that if a survey be effected by the State, it would not be done so satisfactorily to the community as it probably would be if managed by individuals immediately interested.

However, a bill, granting a charter for the South Carolina Railroad, was passed December 19, 1827. Fifteen days after, January 4, 1828, a meeting of the citizens was called and a committee appointed to report on that charter at the next meeting. The second meeting was called in the Charleston *Courier*, January 7, 1828, as follows:

> A meeting of the citizens is requested at the City Hall, this day, at one o'clock, to take into consideration the report of the committee on the subject of the railroad from this city to Hamburg. At a previous meeting on January 4, the sub-committee had reported unfavorably. This committee pointed out many parts of the General Act of the Legislature for incorporating companies for constructing turnpike-roads, bridges, and ferries that were inapplicable to a railroad company, as the bill now before the Legislature.

January 29, 1828, the first charter of the South Carolina Railroad was

THE "EVERETT" WAS BUILT BY THE BALDWIN LOCOMOTIVE WORKS, ABOUT 1878, FOR THE BOSTON AND MAINE RAILROAD. IT WAS DESIGNED FOR SWITCHING AND PASSENGER SERVICE IN CITY STREETS. FOR PASSENGER SERVICE THE ENGINES WERE FITTED WITH A PATENT EXHAUST CHAMBER INTO WHICH THE STEAM PASSED MUFFLING THE NOISE



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granted. The stockholders organized as a company on May 12, 1828. This was the second railroad company formed in the United States for commercial purposes and the transportation of passengers and freight.

At one of the earliest meetings of the projectors, Horatio Allen was invited by them to fill the position of chief engineer of the contemplated work. Mr. Allen made a report at the first meeting, recommending the kind of road to be constructed and the best power to be used.

Having visited England to examine the progress made in railroads and locomotives, and having been requested, while in England, by John B. Jervis, chief engineer of the Delaware and Hudson Railroad, to contract for the iron for that road and procure for it three first-class locomotives, the Charleston board of directors had confidence in his skill and judgment.

In his report at this first meeting, Mr. Allen used all the arguments at his command to recommend the construction of the road for steam power. He was so successful that at the meeting on January 14, 1830, when the report was acted upon, Thomas Bennett offered a resolution to the effect that "the steam alone should be used upon the road, and the selection of the locomotive would render the application of animal power a great abuse of the gifts of genius and science."

At the same period, that is, prior to the great locomotive trial in England, and when the Baltimore and Ohio Railroad Company were so strongly impressed in favor of horse-power, it became necessary for Horatio Allen, as engineer of the South Carolina Railroad Company, to decide for what power that road should be built.

The road was one hundred and thirty-six miles long. From the character of the country, the plan of the road would be naturally influenced by the kind of power adopted. Stationary power was out of the question; but the opinion was held by many of great intelligence that horse-power should be tried.

In the report Mr. Allen made on this important question, he submitted a comparative estimate of the results of "horse" power and locomotive power. That estimate was in favor of locomotive power, but he rested the decision on the basis that, what the performance of a horse was and would be, every one knew; but the man was not living who would undertake to say what the locomotive was yet to do.

In the recommendation of this report in favor of locomotive power, the Board of the South Carolina Railroad Company

unanimously concurred, and as this decision was the first on any railway built for general freight and passenger business in this country or in England, it has been referred to as one of the interesting facts in the early history of railroads.

The preparations for the work were at once commenced, and the road was begun in 1829. Six miles were completed in that year.

Like the Baltimore and Ohio Railroad, a number of experiments were tried with different methods of power.

The company offered a premium of five hundred dollars for the best locomotive by *horse-power*. This premium was awarded to C. E. Detmole, who invented an engine worked on an endless-chain platform. When this "horse-power" locomotive was completed and tried on the rails, it made twelve miles an hour and carried twelve passengers.

A sailing-car, a car moved by the wind, was also tried upon the road in 1830. The Charleston *Courier* of March 20, 1830, said of this car:

> A sail was set on a car on our railroad yesterday afternoon, in the presence of a large concourse of spectators. Five gentlemen got on board and flew off at the rate of twelve to fourteen miles an hour. Thirteen persons and three tons of iron were carried about ten miles an hour. The preparations for sailing were very hastily got up, and, of course, were not of the best kind; but owing to this circumstance the experiment afforded high sport.
>
> The wind blew very fresh from about northeast, which, as a sailor would say, was "abeam," and would drive the car either way with equal speed. When going at the rate of about twelve miles an hour and loaded with fifteen passengers, the mast went by the board with the sail and rigging attached, carrying with them several of the crew. The wreck was cleared by several friendly shipmasters, who kindly rendered assistance in rigging a jury-mast, and the car was again soon put under way.
>
> During the afternoon the wind changed so as to bring it nearly ahead when going in one direction; but this did not stop the sport, as it ascertained that the car would sail within four points of the wind. We understand it is intended by some of our seamen to rig a car properly, and shortly to exhibit their skill in managing a vessel on land.

The president of the road, one Tupper, in one of his reports, stated that on March 1, 1830, the committee to whom the matter was referred had reported that they had accepted the offer of E. L. Miller, of Charleston, to construct a locomotive at the West Point Foundry, New York, and that it should perform at the rate of ten miles per hour, instead of eight, as first proposed, and carry three times the weight required the year before by the Liverpool and Manchester Railroad.

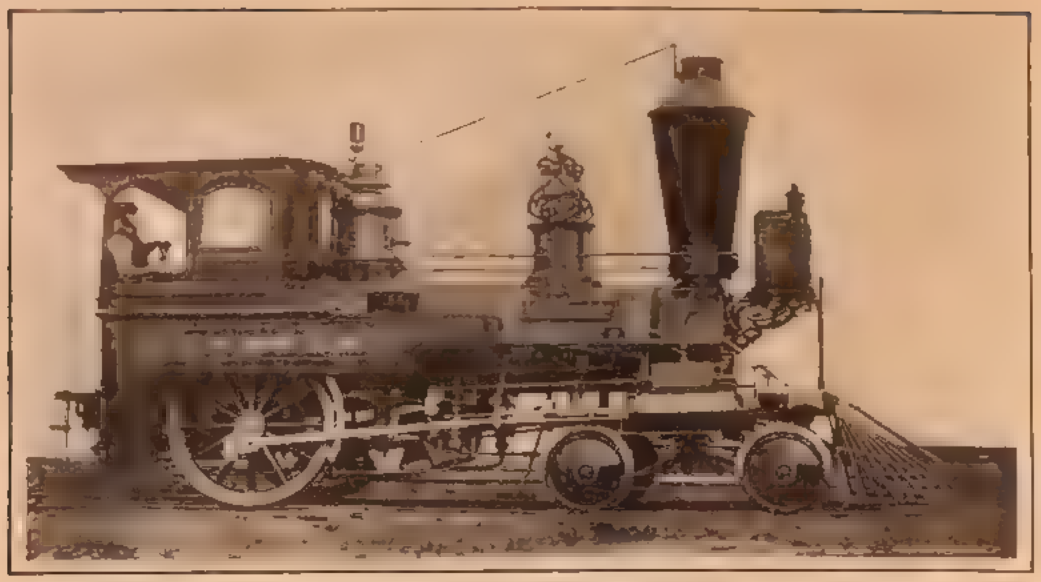
Mr. Miller immediately began the construction of his locomotive. His plans and specifications were drawn out by the same Mr. Detmole. Meantime the work on the road was pushed forward and another mile completed. This made seven miles ready for use.

(To be continued.)

CURIOUS RAILROAD INVENTIONS.

INVENTORS always will be a queer fraternity, says *The Railway Magazine* when they venture upon ground where they are ignorant of technicalities. We all know the famous proposals for "feather-bed" coaches, or spring buffer vehicles, designed to absorb the shock of collision, *when it occurs*, that is, provided a catastrophe does not happen when the buffer-car is at the wrong end of the train, or is laid up for repairs. Another idea several times promulgated is that of allowing one train to pass over another. But even these proposals do not exhaust the list, as the patent records and much newspaper correspondence following every serious railway accident abundantly testify. Other suggestions of which we have recently heard afford evidence of the amazing lengths to which amateur railway inventors will proceed. Here are a few specimens that have been recorded:

(1) Coaches fitted with duplicate wheels, so that in the event of breakage, one can be removed, and the reserve brought into use without delay. (2) Sewing machines operated from the axles of passenger coaches, for the benefit of industrious lady travelers. (3) An automatic lunch counter for trains, delivering various drinks and eatables when coins are inserted in slots. (4) Traveling cots for babies. (5) Coin-freed cameras for taking views from trains. And so on, almost *ad infinitum*.



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Like the Baltimore and Ohio Railroad, a number of experiments were tried with different methods of power.

The company offered a premium of five hundred dollars for the best locomotive by *horse-power*. This premium was awarded to C. E. Detmole, who invented an engine worked on an endless-chain platform. When this "horse-power" locomotive was completed and tried on the rails, it made twelve miles an hour and carried twelve passengers.

A sailing-car, a car moved by the wind, was also tried upon the road in 1830. The Charleston *Courier* of March 20, 1830, said of this car:

> A sail was set on a car on our railroad yesterday afternoon, in the presence of a large concourse of spectators. Fifteen gentlemen got on board and flew off at the rate of twelve to fourteen miles an hour. Thirteen persons and three tons of iron were carried about ten miles an hour. The preparations for sailing were very hastily got up, and, of course, were not of the best kind; but owing to this circumstance the experiment afforded high sport.
>
> The wind blew very fresh from about northeast, which, as a sailor would say, was "abeam," and would drive the car either way with equal speed. When going at the rate of about twelve miles an hour and loaded with fifteen passengers, the mast went by the board with the sail and rigging attached, carrying with them several of the crew. The wreck was cleared by several friendly shipmasters, who kindly rendered assistance in rigging a jury mast, and the car was again soon put under way.
>
> During the afternoon the wind changed so as to bring it nearly ahead when going in one direction; but this did not stop the sport, as it ascertained that the car would sail within four points of the wind. We understand it is intended by some of our seamen to rig a car properly, and shortly to exhibit their skill in managing a vessel on land.

The president of the road, one Tupper, in one of his reports, stated that on March 1, 1830, the committee to whom the matter was referred had reported that they had accepted the offer of E. L. Miller, of Charleston, to construct a locomotive at the West Point Foundry, New York, and that it should perform at the rate of ten miles per hour, instead of eight, as first proposed, and carry three times the weight required the year before by the Liverpool and Manchester Railroad.

Mr. Miller immediately began the construction of his locomotive. His plans and specifications were drawn out by the same Mr. Detmole. Meantime the work on the road was pushed forward and another mile completed. This made seven miles ready for use.

(To be continued.)

CURIOUS RAILROAD INVENTIONS.

INVENTORS always will be a queer fraternity, says *The Railway Magazine* when they venture upon ground where they are ignorant of technicalities. We all know the famous proposals for "featherbed" coaches, or spring buffer vehicles, designed to absorb the shock of collision, *when it occurs*, that is, provided a catastrophe does not happen when the buffer-car is at the wrong end of the train, or is laid up for repairs. Another idea several times promulgated is that of allowing one train to pass over another. But even these proposals do not exhaust the list, as the patent records and much newspaper correspondence following every serious railway accident abundantly testify. Other suggestions of which we have recently heard afford evidence of the amazing lengths to which amateur railway inventors would proceed. Here are a few specimens that have been recorded:

(1) Coaches fitted with duplicate wheels, so that in the event of breakage, one can be removed, and the reserve brought into use without delay. (2) Sewing machines operated from the axles of passenger coaches, for the benefit of industrious lady travelers. (3) An automatic lunch counter for trains delivering various drinks and eatables when coins are inserted in slots. (4) Traveling cots for babies. (5) Coin-freed cameras for taking views from trains. And so on, almost *ad infinitum*.

ONE OF THE MINIATURE TRA
RAILROAD [illegible]

"TOY" RAILROADS THAT MAKE MONEY.

With Miniature Locomotives and Cars, the Festiniog, in Wales, and the Long Otavi Line of South Africa Earn Dividends for Owners.

BY MONTGOMERY AMES.

THE Festiniog Railroad, a railroad not much larger than that which a king might have constructed to amuse the children of the royal household, has taken its place among the most successful lines in Wales. In operation for over seventy years, it is distinctly profitable and pays satisfactory dividends. The Festiniog is one of the toy railroads of the world, for it is equipped with mere miniatures of the great rolling stock of our modern systems.

The Festiniog Railroad is the first of its kind ever constructed. It was built in 1839 to facilitate the transportation of slate from the Welsh quarries to Portmadoc. It was operated by gravitation and horses. The long inclines would carry the cars to their destination, while horses would haul back the empties.

In 1863, after twenty-three years of service for the quarries, C. E. Spooner, an engineer, suggested that the steam-engine be introduced and the railroad reconstructed to carry passengers and freight. The suggestion was adopted, and in that year, its period of business and finance began.

The Festiniog Railroad is thirteen and one-half miles long. Its gage is 23¼ inches. From terminus to terminus it ascends or descends the inclines along which the old gravitation equipment once rolled. On the journey northward the difference in the altitude of the two terminals is 700 feet, which means a constant climb from Portmadoc. The grades are various in their severity. The curves are many and sharp. In many places a train of the usual number of cars winds around two or three curves within its own length.

Its first locomotive was called the "Little Wonder," and it has won its title, for after almost thirty-five years on the rails, it is still in efficient service. It was built in 1869. Its cylinders are 8½ inches in diameter with a stroke of 13 inches. The drivers are 28 inches in diameter. Its height is about that of the average man.

Notwithstanding its size it can haul a train of 7 passenger-cars, 10 box-cars, a caboose, and 100 or more empty slate-trucks—a string measuring more than 1,200 feet in length, and weighing 110 tons. It makes the grades without difficulty, and on the more favorable stretches it can attain a speed of 30 miles an hour.

The railroad possesses several features of technical interest, for, being a one-track road, it is equipped with passing sidings, spurs, and the necessary telegraphic and signal equipment to render the operation of the road perfectly safe. There is little or no danger to passengers, in fact it is not known that a collision or derailment has ever occurred.

Might Bump Their Heads.

The engineer and fireman face what is practically the only danger on the road—the tunnels. When the tunnels were built, little or no clearance was allowed above the tops of the cars, for the possibility of the steam-engine and its crew was not then considered. When standing on the deck, the heads of the fireman and engineer extend above the entrances of the tunnels, and serious accidents might result if they failed to lower their heads when running into one of the passageways.

Though the passenger-cars are small, they furnish comfortable accommodation for fifty passengers.

In 1911 over 35,000 tourists rode on the Festiniog.

The success of the Festiniog encouraged others to construct miniature narrow-gage railroads. In North Wales the North Wales Narrow-Gage Railroad is being operated, but the most famous of the world's "toy" railroads is the Otavi line in South Africa. It is the longest little railroad in the world, extending 368 miles from Swapkomund, on the coast of German Southwest Africa, to Tsumeb, in the heart of the wilderness. Its gage is two feet.

In 1903 a party of construction engineers sailed for Africa with the first cargo of material. The question of securing labor was a most distracting one. Strikes occurred, the Europeans found much difficulty in commingling with the natives, but eventually, in 1906, the road was finished.

OLDEST LIVING HOGGER.

C. Augustus Jeffries, Born Ninety Years Ago and Still Hale and Hearty, Tells of the High Spots of His Interesting Life as a Pennsy Engineer of the Fifties.

BY H. M. LOME.

"SINCE the day I began railroading, in 1846, there's been mighty changes in equipment and methods; but it seems to me that the boys haven't changed a bit. I s'pose this is owing to the railroad business calling for men who have sound brains and bodies, grit and get-there, and a liking for wheels and grease.

"The consequence is that while the lay out of the railroads may be much different from what they used to be, the make-up of the boys is about the same all the way through."

The speaker was Charles Augustus Jeffries, or, as he prefers to be called, C. Augustus Jeffries, as he has a son who bears his full name. Not only is Mr. Jeffries the oldest pensioner of the Pennsylvania Railroad, but, according to his statement, which is confirmed by the company, the oldest American railroad engineer now living. Born October, 1822, he became a fireman on the State-owned Columbia and Philadelphia Railroad in 1846. Three years later he was promoted to the post of engineer. When the Pennsy acquired the Columbia and Philadelphia, it took over Mr. Jeffries. He continued as an engineer until 1883, when he was made signal-repairer. In 1900, he was put on the pension list.

Mr. Jeffries lives in the town of his birth, Lancaster, Pennsylvania. In a quiet, homelike, cozy residence the venerable engineer and his sister keep house. Miss Jeffries is a pleasant-mannered lady who, like her brother, has youth in her heart, though the years have silvered her hair.

The nonagenarian engineer is rather small of stature, has a finely shaped head covered with a thick growth of snow-white hair, and it is easy to see that in his younger days he must have had his full share of bodily strength. He stands as straight as a rake-handle, and aside from a slight deafness, he is in full possession of all his faculties.

In conversation he shows no signs of his great age, but keeps the talk-ball rolling without cessation. He enjoys a joke and readily gives a humorous turn to a discussion when an opportunity occurs.

When asked if he felt the weight of his ninety years, Mr. Jeffries replied by giving a series of calisthenic stunts of a more or less strenuous nature, ending the performance with a startling climax of high kicking, during which his toe-tip was on a level with his nose!

"How's that for a kid on ninety?" he asked triumphantly, and his eyes twinkled with laughter. "Don't look as if the grasshopper was a burden, as the Good Book says. What? No, sir; I know I'm not a young chap any longer, but I sometimes feel as if I weren't a day over thirty.

Became Fireman to Better Himself.

"What got me going as fireman? Well, 'twas like this. My father was a mechanic in a local shop and it was intended that I was to follow his trade.

I did put in some years at it, but like most boys I wanted to see the world and get better pay than I was earning

"The railroad seemed to offer both, so I jumped aboard the first tallow-pot job that was offered me. The pay? Well, it wasn't so much in those days, but it was better than being confined to a shop.

"Firemen in those days were paid one dollar and twenty-five cents a day, and engineers two dollars. Some years later, the State Legislature passed a law that the engineers should get two dollars and fifty cents, and we thought it quite generous. In those days there was no Brotherhood.

"We earned all that came to us. Looking back, it seem to me that we took our lives in our hands every time we started out on a run. There were no block signals; no interlocking systems. We worked mostly by rule of thumb, and the keeping of the schedules depend ed on the weather and what happened at the depots where we stopped.

CHARLES AUGUSTUS JEFFRIES, NINETY YEARS OF AGE, THE OLDEST LIVING LOCOMOTIVE ENGINEER. HE IS ONE OF THE PENNSYLVANIA'S EIGHT PENSIONED NONAGENARIAN EMPLOYEES

"On foggy days we crawled, and on foggy nights we just barely kept her moving—no more. Fenced-in track, so far as the Columbia and Philadelphia Railroad was concerned, was unknown, and cattle made the track a loafing-place night and day, especially when the weather was thick. I'd hate to say just how many tons of beef I made in those days.

"And the engines we had! Ha, ha, ha! Made right here in Lancaster, most

of 'em were, although some came from Philadelphia. The engine I first went firing on might have weighed four tons. She had two drivers, a truck of four wheels, and a tender in which we carried wood and water.

"Coal was used as fuel on only a few engines. The engines were built without cabs, and when we came to a low bridge we had to use a long iron rod that ended in a hook to buckle up the smoke-stack which worked on hinges. There was a good deal of such hooking on my run, and in foggy weather or on dark nights we were continually bumping into bridges that we'd come to before we knew where we were.

"I never got hit myself; but when I became an engineer two or three of my firemen got pretty bad cracks on their thought-domes in this way.

"And those cabless machines *were* cold in winter! Many's the time that I reached the end of the run with my face so purple with cold that I looked as if I was wearing a mask. Frost-bitten? Yes, sir; on many trips—and my eyelids were so puffed I could hardly see.

Roasted and Froze at Same Time.

"Worst of it was we were roasting from the knees down while we were freezing from the chest up. There was very little space between the fire-box and the rear of the engine, so we got all that was coming to us from the heat as well as the cold. It seems that we used to get harder winters than nowadays, and I tell you that the westward run through a heavy snowfall, with the wind in one's face was no joke in those cabless engines."

Mr. Jeffries asked his sister to fetch a daguerreotype of the first engine that he ran. It was a tiny machine with just enough room for the driver to stand back of the fire-box, while in comparison the tender was very large, because of the huge supply of wood that it had to carry. The photographer had put a graphic touch on the negative by making it appear that the machine was "popping" furiously.

"Built in Lancaster, and could make her twenty-five or thirty miles per, when put to it," said Mr. Jeffries proudly. "No, she hasn't any cab, I know, but whether she froze us or put us in danger of sunstroke, she was a beauty just the same." The old engineer looked fondly at the picture.

"Now, I'll show you the picture of the real locomotive that I drove for — oh, more years than I can remember. Come along."

He led the way into the sitting-room, on one of the walls of which was a large picture of the John C. Breckenbridge done in water-colors. To one accustomed to the huge engines of to-day, it looked spidery and dwarflike, but to the veteran engineer it was evident that it was still the combination of speed and strength as he knew it. Mr. Jeffries sighed in prideful contentment as he eyed the picture.

His Engine a Rainbow of Color.

"There she is," he said, "just as she looked the day she came from the shops, and I was made her captain. T'other one was all right, but this put it all over the little one. She was a glittering beauty. When she got in the sunlight, she fairly twinkled. Her smoke-stack—d've note the shape of it? Like a megaphone turned upside down. It was polished brass. So were her forward and rear steam-domes and her whistle, bell, and sand-box.

"See that perky eagle cocked on the sand-box? Her boiler, cylinders, and steam-chest were cased in polished brass. It took a mighty lot of elbow grease to keep her in trim; but we didn't mind, for we took a pride in making 'John' shine like a star.

John C. Breckenbridge has a cab, you see," went on Mr. Jeffries after a pause, "also two trucks with four wheels on each and four drivers. Yes, the pilot does seem a trifle skinny, but it did the work, and we didn't spare any paint. The drivers as well as the truck-wheels were bright red and green to match the tender, which certainly was a handsome thing.

"Steam? I should say she could. She'd make thirty-five without loosening a nut, and she'd answer the levers like a tender-mouthed horse. Weight? I should say about ten tons.

"I most forgot to say that the tenders of those times were all built on the same

plan. There was a water-tank in the center and the space around was packed with wood, or wood and coal, as the case might be. We burned hard wood, and when we were really making a run the fireman hadn't much time for whistling. Wood in a fire-box don't last like anthracite.

"Many of the cabless engines had crank-axle drivers that were continually breaking. Many times we had to stop in a blinding snow-storm and make repairs. The boys of to-day have a lot to be thankful for.

"I never had much trouble in taking hold of improvements as they came along. A short period of instruction was sufficient. I had more trouble getting used to the air-brake than anything else. When you have been keeping company with hand-brakes for a good many years, it's hard to give 'em up and flirt with air.

"Passenger-coaches were quite comfortable in the early fifties, for the reason, I think, that all coaches were the property of private companies who let them to the railroads at so much a year. No railroads owned their coaches in those days, so far as I know. Among the coach companies whose names I recall were the Miller, Schofield, and People's companies, and the rivalry between them brought much comfort to the traveling public.

Old Snow-Fences Still Standing.

"There were no independent baggage-cars. Baggage was carried on a sort of shelf below the passenger-car. Ever seen a mammy possum with her babies clinging to her while she tried to get away from you? Then you'll understand why these baggage-cars were christened 'possum-bellies.'

"As traffic and the baggage business increased, cars were set aside for the transportation of passengers' belongings; but until late in the fifties, the possum-belly was a common sight on Eastern roads.

"No, sir, there were no dining-cars in those days. Passengers either stocked themselves up with grub, or we stopped the train near a handy hotel along the line and waited until the meal was finished. These stops made a pleasant break in a long journey and didn't interfere much with the schedule.

"Another thing that we didn't have in the early days was the snow-plow. When the track had to be cleared, we used to couple together six or eight engines and buck the drift. Sometimes we got through, and sometimes we didn't. If stalled, we simply had to wait until the weather did what we couldn't.

"But we did rig up snow-fences, and I believe that we were the first line in the East to do so. At various points in Pennsylvania the fences are still standing which were erected when I was a young man. They are about as high as your chin.

"Fifty-five years ago the average speed of a passenger-train was about twenty miles an hour. On occasions, I boosted her up to thirty, but not often. Nowadays people kick if they can't be shot along three times as fast. It's surely a rapid age we're living in—a very rapid age; but do we get quite as much fun out of life as we used to? I doubt it. We are so busy speeding that we haven't time to enjoy anything but the speed.

Lucky in Wrecks.

"Was I in many wrecks during my railroading? Naturally. Wrecks are a part of the business. But I'm proud to say that no human life was ever lost in all the smash-ups in which I figured.

"Luck? Maybe; but it was fortunate luck, consequently I sleep all the sounder. I ran into and I was run into, but, as I've said, nary a man, woman, or child passed away in one of those smash-ups. What is more, I never was hurt badly myself.

"The only time I was really bunged up was when I was riding as a passenger. On that occasion I had ended my day's run at Philadelphia and was returning home on a passenger-car. Just this side of Paoli we struck a broken rail and the car went down the embankment.

"Such an accident confuses a man. It was a minute or so before I could make out what had happened or where I was. Then I discovered that I was as near standing on my ear as I ever expect to be and my toes were close to my head."

Mr. Jeffries laughed loud and long at the remembrance of his predicament, and throwing himself back in his chair he tried to give a graphic illustration of the position in which he found himself.

"Don't do that, Charles, you may hurt yourself," reproved Miss Jeffries.

The old man brought his feet from above his head and with a broad smile continued his story.

"The car was upside down and so were all of us who were inside. Just then we heard some one outside cry "Fire!" and the smell of smoke came to us. I kicked out a window and scrambled through. Our car was in flames all right, and a pretty lively time we had rescuing the rest of my traveling companions. When the excitement was over I discovered that I had hurt my right instep badly; so much so that I was laid up for weeks."

I asked Mr. Jeffries from what classes or trades the railroads in the old days secured their men.

"If a man wanted to become a fireman or an engineer," said Mr. Jeffries, "he must have had some acquaintance with machinery. I inherited a liking for wheels from my father, which accounts for my being a mechanic before I took to railroading. Then, too, Lancaster was always a manufacturing town and the boys here were more or less familiar with machinery. When the Pennsylvania Railroad took over the other road, there was a rush of young men from this town to the main offices of the company. In many cases their applications were successful.

"A love of railroading is born in a man. There's my son, Charles. Nothing would do but that he follow his father's example, although he had chances in other directions. So to railroading he went, became a conductor on the Pennsy and kept on the job until a coupling-engine impaired his usefulness. He, too, is on the pension list and lives close by. Our company certainly does look after its old men. It's good policy. A man takes care of a job if he knows that when his working days are over he'll be looked after by his employers.

"When I was a boy, this country was so wild that we used to hunt bear and other animals. Now look at the land! And what brought about the change? The railroad.

"When one thinks what the railroads have done the world over, it makes him feel proud to be a railroad man."

When I started to catch my train for New York, the old engineer gripped my hand keenly and said:

"Come and help me celebrate my hundredth birthday."

I hope to have that privilege.

ELECTRICITY FOR FREIGHT HANDLING.

IN the discussion of the use of electricity on railways, a new note is struck by E. M. Herr, president of the Westinghouse Electric and Manufacturing Company. He takes the advantages of electricity in passenger terminals as accepted and puts the stress on the advantages of electricity in collecting, moving, and distributing, and delivering freight.

"The statement has been made," says Mr. Herr, "that the cost of moving a ton of freight from the point at which it originates to the railway-car which is to carry it by rail to the railway terminal of its destination, added to the additional cost of delivering it from car to consignee's store, factory or warehouse, is as large as the entire charge for rail transportation for a large proportion of freight handled by rail which has to be delivered by dray or truck.

"Why then should not the railways themselves arrange to collect and deliver freight, especially package freight, at terminals?"

The question is pertinent. The English railways do this.

"Here again electricity can be of great service in furnishing the power to drive the telpherage for loading and unloading cars and supply the motive power of a fleet of auto trucks and drays so handled as to cause the minimum delay of freight cars at terminals and promptest delivery of package freight at the lowest cost," further says Mr. Herr. No business man is likely to doubt that the work could be done by the railways at less cost than by the shippers and consignees except in unusual conditions.

As to the economy of electricity as motive power for trains, Mr. Herr thinks that the concentration of electrical power plants into enormous installations of centralized plants, so located as to distribute power over large areas at minimum cost, would result in a saving of 200,000,000 tons of coal, by conservative estimate, every year.

—*Knoxville, Tennessee, Sentinel*

Honk and Horace.

BY EMMET F. HARTE.

Our Old Friends Bid Us Farewell After Solving the Tangle of the H. T. P. Co.

CHAPTER XV.

Cargoes for Eleven Ships.

ITH Captain Tuttle safely sequestered on board the Belle of the South, immune from feminine interference, we were ready for business. Addicks scattered the word that the H. T. P. Company was in the open market for fruit.

The surrounding country responded with alacrity to a bountifulness that surpassed all expectations.

They made a clean-up. By bullock-carts and pack-donkeys, a motley horde brought the luscious green banan', the juicy unripe orange, the fig, the coconut, the date. Truly there was endless variety; yam, papaw, chilli-pepper, and tapioca brought they them — and great was the stir and hubbub thereof.

Brigands from a distance of four or five miles, swarthy, stalwart, swaggering, and black-browed dumped their offerings to the right, to the left—anywhere but the right place—and joined in the general bedlam of jabber and gesticulation.

Addicks, Mrs. Brown, Mrs. Smith, Mrs. Robinson, and I received and paid for the fruit at the wharf warehouse. Miss Vandiver and Aunt Bev were present, but not of any particular use; both were scared silly.

I, myself, at times felt daunted when fifteen or twenty shouting, wild-eyed pig-Latins surrounded us, apparently clamoring for our blood. Addicks, however, sat imperturbable throughout the uproar.

"Ha-hadn't we better call the military or the policeos?" I asked, during one particularly hair-raising demonstration, as a snarling rioter in a red sash menaced me with both hands upraised and screamed some awful denunciation.

"That fellow says he'll take five pesos for his whole load," Addicks explained patiently. "Give him his credit slip."

All altercations and disagreements being settled without the actual shedding of blood, the mob dispersed and the dove of peace came forth from its barricaded cote, whence it had taken refuge, chirruping happily once more.

The H. T. P. Company—or the minority stockholders in charge—then did a little lightning calculating, took off a trial balance-sheet, using New Orleans market quotations of two days previous, plus freight and switching charges, re-ice at Atlanta and Richmond, and notify promptly by wire—er, yes—and found that they had cleared the snug figure of $14,000 or some such sum.

Everybody felicitated everybody, and Mrs. Brown dictated a long letter to Captain Tuttle instructing him to apprise all and various freight-steamers he might meet going or coming that the company was prepared to charter, barter, or purchase for cash to carry tropical products from hither to thence.

But let us get back to the brick-yard. The railroad poked its nose five miles farther, meanwhile, and Honk's well-baked face, fused by the heat, had

welded itself permanently into a large, mahogany-colored smile. He strongly indorsed the fruit-shipping venture, and said that, for amateurs, we had made a splendid beginning.

He went so far as to predict an immediate commercial success of such extravagant proportions that I found myself actually feeling sorry for the steel and oil magnates with their comparatively picayune enterprises.

The Belle of the South steamed away with the stars and stripes at the bat and Captain Edgebert Tuttle on deck, and Santa Maria once more wrapped the drapery of its couch about herself and lay down to pleasant dreams.

At exactly three o'clock and thirty-three and one-third minutes, post meridian, a shadow passed between me and the sun. It was a pigeon. Addicks brought the message along presently.

"Los Cocos quite lively," wrote Cushing. "Citizens waking up. Saw two men on the street within last hour. About to obtain important option on rubber-tree tract. Details later."

Time and tide keep moving. Hasten, fellow sluggards, lest we get lost in the shuffle! Skip a week—two weeks! Ah, thanks, old Scythe-bearer!

Came a dulcet evening when but a scant three or four miles intervened twixt Honk's track-layers and Los Cocos Save that insignificant gap—a mere step, as it were—the task was finished.

Forty-odd miles of steel highway stretched like a gray ribbon of sun-baked earth through jungle and field; a strip of alien soil a stone's throw in width, at whose edges the quick-sprouting vegetation stopped nonplused. A few crawling creepers ventured out, but soon grew discouraged.

The jungle respected Honk's edict: "Thus far shall you come, but no farther!"

Already, along the line, budding stations of grass and 'dobe huts were springing into being overnight, like fungi. Prospects were good for a rousing local passenger business when the line should be formally opened for traffic.

Honk and I sat desultorily discussing these things over our post-prandial pipes. As the logical sequence of a pipe is smoke, I presently marked in the northeast a dense smudge of the same. It looked like the Caribbean Sea was on fire. I made some sort of an illuminated remark to that effect.

"Ships," quoth Honk laconically. "Must be a whole fleet. Maybe the Atlantic squadron is down here browsing around."

If such was the case, it soon became evident that they were about to pay us a visit. A numerous covey of vessels rose out of the deep and headed lickety-cut for the Bay of Bonagua.

I counted twelve — lost count — recounted, and made it fourteen. Honk tried it, and announced a total of seventeen schooners, one sloop, and a four-masted tug—but I think he got excited.

By actual enumeration, the armada compromised ten in all, flying half a dozen different flags.

The Belle of the South was among them. It turned out that she was leading the outfit. Captain Tuttle had ransacked the seas for fruiterers and his drag-net had made a variegated haul.

A little of unnecessary red tape was involved in getting down to plain business with Captain Tuttle. He first sent Esteban as envoy non-potentiary bearing a note addressed to "any authorized male representative of the H. T. P. Company."

Esteban couldn't read 'ritin', so he gave the note to me. It stated that one Edgebert Tuttle, in command of the ship Belle of the South, would be pleased to arrange for a meeting, either on shore or on board his ship, for the transaction of all matters of a business nature—the discussion of future plans, etc. — and that no women of whatsoever description were to be present.

We sent a reply couched in the formal phraseology of courts—legal and liege—expressing our abject contrition for being alive, how overwhelmed we were at the implied honor conferred upon us, and hoped he would feel free to suit his own convenience in regard to the proposed conference.

That made him sore. He disembarked in the middle of the night with his tin box under his arm and insisted on rendering his reports before morning.

An all-night session resulted. Honk said, however, that it was in line with everything else connected with the com-

pany. He said the whole project was irregular, if not actually illegal, but he wound up with a poetic allusion in which the words "dog eat dog" were used as a foundation for philosophical purposes.

After matters pertaining to the initial voyage had been adjusted, there ensued a couple of days' haggling through go-betweens, between Mrs. Brown and company and sundry and various skippers of tramp freighters.

Contracts were ultimately signed with all of 'em, and then the company got busy trying to find cargoes for the eleven stout ships. I forgot to mention that one slow-goer arrived after the official count was announced.

Cargoes for eleven ships.

What say we make this phase of the narrative more vividly interesting by doing a running broad jump over the details of this monumental task?

While in the air, I'll take occasion to say that we enjoyed a week or ten days of near-carnival excitement and that we bought and loaded *some* fruit, if anybody asks you. But we accomplished it—assisted by the entire population of that section of Central America, 'tis true, likewise the railroad, which helped a lot.

We stood, a bit tousled, mayhap, and fruit-stained, but very hopeful, at the water's edge, on a scintillant summer's morning, watching our fleet of goodly ships sail away.

The first trip of the Belle of the South had netted Mrs. Brown and her associate venturers a neat, five-figured sum—$12,000 or $21,000, if I remember correctly. And eleven times $12,000 or $21,000, as the case may be, is something to contemplate on a scintillant summer's morning at the edge of the slobbering sea.

While in the throes of this sublime ecstasy, so to speak, how natural it is that the ridiculous must needs obtrude itself upon us. I saw a stodgy figure on the deck of a receding ship—I think it was the Bouncing Betty—and I started in surprise.

For, as one pea is like unto another, the figure was a living presentment of the recreant and all but forgotten Captain Toomey. The same square-cornered, bull-terrier pose, the round body, short neck, grape-shot head, surmounted by a faded blue, bent-vizored cap—I stared, open-mouthed, much after the manner of one who sees a long-lost ghost.

The figure stood glowering, then raised an arm and shook what looked like a clenched fist at the poetic scene it was leaving.

I clutched the arm of Addicks with one hand and the shoulder of Honk with the other.

"Look, quick!" I exclaimed. "On the deck of the next to last boat! See the man that looks like Napoleon taking his last rubber at France? A toothpick to a ten-dollar bill that that's our old friend, Toomey!"

"Impossible!" said Honk.

"At all events, unusual," agreed Addicks.

"Just the same, if that isn't Toomey, I'll eat my hat!" I insisted. "But to make sure, I'll run to the *cuartel* and find out to an absolute certainty."

I didn't run the entire distance—it was too far, and the weather was too ardent for marathoning—nevertheless, I made good time on the trip.

Once there, I awoke the solitary guard in charge and we conversed. Quite a while afterward we arrived at some sort of a misunderstanding to the effect that I desired greatly to look upon the one large-girthed prisonero of a "muchness the to swear" and also the to eat—eat! Ah, *sacramento! Señor!* Yes!

Whereupon we entered the kennels. We traversed a runway or corridor. My conductor continued to talk, and did not hurry. The cubby hole allotted to the hungry and profane Americano capitan was in the far end.

We reached it in time, but, unfortunately, too late. The captain wasn't in; but there was a hole, opening, or aperture in the rear wall, of a size sufficient to admit the passage of a person of Captain Toomey's portliness.

The guard seized upon this clue almost instantly. He rolled his eyes and spoke rapidly.

"*Hola! Dios!* Was it possible the pig had rooted his way out? *Animo! Quedito! Ohe!* Help! Help!"

I coincided with his views politely and bowed myself out. The place had an odor, anyhow. Outside, I bethought me of the captain's threatened cablegram. It was but a step to the telegrafos-office. I harked thither.

For two dollars and fifty cents the clerkeos assured me that Captain Toomey had, indeed, despatched a message several hours before. For five dollars I would be allowed to read the same with my own eyes. Yes. But the two fifty was all I had with me, so I took the fellow's word for the rest.

Addicks viewed the matter more lightly than I had persuaded myself to expect. He even indulged in a ripple of amusement.

"There's no cause for general alarm," said he. "We're pretty well entrenched in our position. Why need we try to evade the issue? Let Stringfellow and his friends come — when they choose. As for the belligerent Toomey—I had already arranged with Ramonez to set him at liberty this evening. He might have saved his finger-nails if—excuse me, I think Miss Vandiver is calling."

Honk went back jauntily to his last league of sunburning. And I—well, I took my regular afternoon off. I reflected with momentary regret that I might have been two dollars and a half better off financially if I had been a little less pertinacious that morning, still the future looked roseate enough for all practical purposes.

The day the railroad was completed, we all felt a wee mite elated. Even Mrs. Robison mustered a semimelancholy burst of exuberance for the occasion, though habitually conservative.

And all along the line, from Santa Maria to Los Cocos, we instigated vivas and flag-waving and wholesale rejoicing. These things help.

Any small outlay of expense in such cases may be freely charged to advertising, for results will justify the same without exception. Therefore we relaxed as mentioned, ran an excursion train festooned with orange-blossoms and Easter lilies, and carried everybody, clothed or unclothed, free of charge.

Lemonade flowed and the population sung songs and whooped it up all day. It was a festal occasion—a gala day.

That evening we had social inveiglements and a far-famed spread in the bungalow. All the state and municipal dignitaries were present with their *señoras* and *señoritas*.

The lord mayor, the dog-catcher, and the minister of interstate commerce were in uniform. Cushing came over with all the *haciendados* and dadesses of Los Cocos, including La Señorita Zuela Carrenas, who was reputed to be wealthy beyond dreams of artifice and twice as beautiful as that, besides being young in her own right.

I noticed that Cushing kept one eye on her during the evening; nevertheless, Addicks was insanely jealous because Miss Vandiver danced with him twice. Honk led a cotillion, or minuet, or something with Mrs. Brown, and I sat out three or four vanilla ices with Aunt Beverly-Travis.

At midnight the joyous throng had just begun to feel thoroughly at home; at 2 A.M. the revelry was at its height; at four o'clock toasts were drunk standing, so you see—

But fifteen minutes later the smiling and suave Señor Don José de Passementerie, or whatever his name was, Minister of Highways and Byways of the republic, rattled his medals and insignia, tapped his chest, bowed, smiled, and by means of other delightful mannerisms signified that he'd been holding back a pleasant surprise for us, but that the moment was then sufficiently mellow, etc., etc.

Principals and auxiliaries representing the H. T. P. Company there assembled kotowed and accorded the distinguished gentleman the most courteous and polite attention.

He spoke in a garbled way of the rich and powerful company, of its marvelous, stupendous, and supereminent success, of his country—her generosity, her patriotism; of himself — a particularly warm number; and then he unrolled a large, crackly foolscap scroll bearing the great red-ribboned seal of state and read a string of extravagant Spanish verbiage in fitting climax to his impassioned and unintelligible eloquence.

Mrs. Brown tittered her appreciation of the tribute.

The other ladies fluttered their fans and tried to look demure. Honk and I bowed and smirked. Personally, I hadn't made head or tail of any of it, but I felt sure it was nothing less than a proffer of the keys to the city — possibly the entire country.

But Addicks stood in somber silence, a black frown on his noble brow. When

the pause threatened to become a rest, he spoke.

"Allow me to translate the dope-sheet, *señor*," he said. "There are those who do not understand—"

'Twas well. Don José curled his mustachios with a flourish.

Addicks took the paper. When converted into the parlance of the anointed it certainly did read something fierce, being no more or less than a polite stick-up.

The Honduras Tropical Products Company, being seized of certain valuable franchises and perquisites, was duly notified that, in the course of human events, it had been deemed necessary to levy a most gracious, specific, and properly authorized tax in the nature of a pecuniary occupation license, or something, amounting in round numbers to thirty-five thousand seven hundred sixty-nine dollars and fifty-four cents, same to be paid within ten days in United States money.

Yes. *Carrambos!*

"I want to know!" said Mrs. Brown.

CHAPTER XVI.

'Neath the Ceiba-Trees.

"WHAT I want to know," demanded Honk in clarion tones, "is the alternative if we refuse to be blackmailed in this way by these pirates?"

The minister of mud-holes grimaced and flicked his epaulets.

"Ah, the droll—the amusing Señor Simpson," he said with a flash of gold-embossed teeth. "The alternative—yes? I am instruct to say only so much. Eef the tax be not paid in diez dias—no? Then will my country of the sureness be compel to confeescate! All shall we take of the propertees. The railway? Yes. The houses—*las casas?* Yes. The lands? The load-wharfs? Yes. The sheeps—"

"Sheeps!" snapped Mrs. Brown. "The man's crazy! We have no live stock."

"Ships," explained Addicks. "Don José uses the plural for oratorical effect, seeing that we have but one ship and it is no great shakes. Still, my friends," in a less flippant tone, "there's no getting around the bald truth in a good part of his statements. It is a time-honored custom among these third-rate countries to levy tribute from whom they can. It is their goose with the golden egg; I've been expecting it all along.

"I hardly thought they'd put the screws quite so forcibly, to start on; thirty-six thousand is rather ambitious. Somebody's been doing a little appraising. The fruit companies are always held up for a slice of easy money in this way. Unless"—he bowed to the smiling *señor*—"the fruit companies readjust the government!"

Don José ceased to smile.

"But the contribution—she will be pay!" said he.

"We sha'n't pay it!" declared Mrs. Brown. "We do not intend to be bunkoed out of money right and left at the beck and call of these heathen!"

"That we do not!" corroborated Mrs. Smith.

"Oh, dear!" murmured Miss Vandiver. Addicks stiffened instantly.

"At least we have ten days of grace," he remarked. "There is no cause for immediate anxiety. Much may happen in ten days. My good friend, Don José, there is a most magnificent moonlight view from the esplanade. Shall we smoke a cigar there, while we stroll?"

"With a supremeness of to be happy," acquiesced the dignitary genially.

The celebration adjourned soon afterward. I thought it had been unduly prolonged, anyway, so far as I was concerned. Early to bed (meaning 4 A.M.) and early to rise, make a man baggy under the eyes!

Cushing decided, under protest, to remain in Santa Maria for a day or two, so it devolved on him to escort the ladies to the Imogen. I noticed that he tore himself away from the Los Cocos delegation only when McMuir had the special train well under way.

Honk sat with his head between his forepaws, immersed in profound meditation for a long time after the last shout of revelry died away in the distance.

"Do you know," he blurted presently, "I've got a clairvoyant hunch that there's something irregular about this tax business?"

"Impossible!" I retorted. "Whoever heard of such a thing in this country?"

"What assurance have we," he continued, "that this isn't a scheme between Addicks and the Don Josiah Passepartout to cop out a little easy money? Couldn't they divvy up and nobody be the wiser? Sure, they could. Furthermore—"

"But Addicks is head over heels in love with Miss Vandiver," I argued.

"Maybe he is, and maybe he isn't. He's a sly dog, you'll admit. Maybe he needs the money to marry on—"

"I won't believe he's crooked," I said firmly. "I won't entertain it. Wait till you hear the returns from the esplanade. Perhaps you'll change your mind."

Honk can be rather obstinate when he thinks he has one of his clairvoyant hunches, as he calls them. He waggled his head pessimistically. I went to bed.

Addicks, I'll have to confess, was somewhat vague in his replies to questions on the morrow. He observed mildly that he saw no reason for anxiety or alarm just then.

He said that Don Quixote had been altogether too high-priced to start out with, but that there might be a slump in the market later. Also, that there was a remote possibility, of course, that a company ultimately might be forced to come through to save their bacon.

I had to admit that, for a diplomatic representative who was supposed to have the interests of his constituents at heart, he seemed unconcerned—even though his clients were about to be strong-armed out of a considerable sum of cash money. Honk was more suspicious than before.

Mrs. Brown and company came on the scene before we had finished shaving and garbing ourselves properly for public appearance.

"Well," said Mrs. Brown, in the manner of a Supreme Court handing down an important decision, "we have threshed it all out. Archie gave us the idea. He has such a mind for legal matters. We have planned our course thoroughly. Archie says this tax has been levied according to law.

"If it isn't paid, the usual procedure is for the government to sell the property of the delinquent for the debt. Whoever buys it in is granted a tax-title which stands good in law. Archie has gone to the mayor or the United States consul or somewhere, to confirm this.

"If it's all straight, we will allow the government to sell the goods and chattels of the old company, according to law. Then, as a new company, we shall bid in the property, pay the money, and take over the title. The original stockholders will then be entirely out of the enterprise, they'll have nothing more to say. It is a splendid idea! Archie thought of it."

"But—" interposed Addicks.

"Now don't tell us it isn't feasible, or I sha'n't like you," said Miss Vandiver.

"I was about to say," he continued mildly, "that the former management would be allowed by law to redeem the concession within a stated time."

"By paying the amount of the tax levied with an additional penalty, yes!" said Mrs. Brown. "But we'll be able to delay settlement for no telling how long, by fighting it through the courts. In the mean time we shall run the business and pocket the proceeds."

Addicks bowed low.

"As a mere tyro in such things," he murmured, "I beg to bend the knee in homage to you, ladies."

Cushing came in during these amenities. He reported, hurriedly, that everything was propitious; the method of procedure was exactly as they'd counted on, and the coup would be easy—even simpler than looting a baby's bank. He then excused himself, saying that an important option or something made it imperative that he should catch the eleven o'clock train for Los Cocos.

Miss Vandiver, for no apparent reason, smiled engagingly at Addicks.

I wonder if by any hook or crook I could squeeze through a love scene in the next ten or fifteen minutes? I've a hundred other things of far greater importance—well, here goes!

First, the setting. A nook 'neath the ceiba-trees. For background, the tropic green of leaf and shoot mingled with the paler tints of feathery fronds and the yellow and white of bursting blossoms. Here and there, like a savage's headdress of clustered plumes, clumps of coconut palms.

For foreground, the molten mirror of the shimmering sea. Above, the limpid azure of the sky. Around, the golden sunshine, the twitter of birds, the hummings and rustlings and whisperings of

life in its myriad forms, seen and unseen. Be that as it may—

Addicks and Miss Vandiver started for a stroll to see a red-headed green paroquet's nest. Having a moment's leisure, I watched them with a fatherly interest from the bungalow window. In spite of Honk's morbid suspicions, I remained loyal to Addicks.

If he loved Fanny Vandiver, I gave him my hearty mental and moral support. I boosted for him telepathically. Being thus in on the deal, so to speak, I had a desire to see the outcome, so I got out Honk's binoculars and stood at the window.

They strolled. He plucked for her a posy. They looked at each other and at the sighing sea. Addicks seemed to be talking. She pointed with gloved finger at something—a bird, a tree—but Addicks continued to seem to be talking.

She allowed him to carry the parasol. They were a long way along the shore where the thin white line of surf feathered and broke on the sands. And, finally, they came to a nook 'neath the ceiba-trees—we've already had that—the setting.

So they sat on a great boulder. And Addicks took her hand . . . he talked some more . . . she listened with face averted . . . but he seemed determined to say his say . . . she looked up, demurely, and suddenly swayed . . . but she didn't fall — far . . . (Don't leave out the dots, Mr. Printer!) . . . and his arm stole . . . but the parasol intervened! Bother!

They returned, a little late for luncheon, both radiantly radiant. Aunt Beverly-Travis pretended to chide. Who, pray, was Aunt Beverly-Travis to intrude her idle chatter upon the sublime somnambulism of love's young dream? Poof, forsooth!

"What do you say, now?" I asked when I had recounted the incident to Honk. "Hardly likely that Addicks would double-cross his affianced wife for the sake of a petty graft, is it?"

"Maybe he would and maybe he wouldn't," Honk grunted evasively. "He's a penniless adventurer, ain't he? Looks to me like a case of everything to gain and nothing to lose. He's a good fellow, all right. Likable and agreeable and all that. And so far as I'm concerned, I only hope he don't burn his fingers in some kind of an intrigue before he's through. Humph!"

CHAPTER XVII.

Who's Who and What's What!

NONE but a foolish pool-player would essay to pocket all the balls at a single cue-thrust. Likewise he is a thoughtless merchant who allows all his bills to come due on the same day.

Tragic, then, shall be the fate of the careless artificer in words who weaves half a score of promising plots helter-skelter, and ultimately is confronted by the nerve-racking task of gathering in the flying threads at one swoop. Wo, wo, indeed! For many and merciless shall be the critics that camp on the bungler's trail!

In the teeth of all this, I shall yet continue. I am of a rash and foolhardy race; a people that cares naught for consequences and very little for expenses; a people that goes in lemons if they come out squeezed.

So I shall grab in the loose ends of this narrative with one lightning swipe; and clip, bind, and tie the climaxes neatly in a bundle, like stogies, submitting them with a single twist of the wrist.

And, as the ponies come bunched in the final dash down the stretch, to flit under the wire in solid phalanx, so shall the action close. If I shouldn't see you at the finish, I take this occasion to say good-by. And good luck, old pals!

All right, let's go!

Mrs. Brown and her devoted coterie awaited with scant patience the day set for the projected confiscation, sale, purchase, and reorganization of the H. T. P. Company's possession.

We toilers in the bungalow office paid little attention to the details, being occupied with a rush of passenger and freight traffic on the railroad.

We supposed it was all cut and dried. Addicks spent most of his waking hours in the company of Miss Vandiver, which made news scarce.

The night before the big day, Tuttle returned with his flotilla.

Day dawned on a busy scene. A bay full of ships, a town full of sailors. The clank and clatter of a dozen vessels in

a roadstead is considerable even though every soul on board be ashore. On the streets bare-legged natives stared wonderingly at noisy groups of sailors.

A bit before noon there came a heavy tramping on the stairs. The door opened. Mrs. Brown, Mrs. Smith, and Mrs. Robison entered. They seemed perturbed.

"We have just come from the what-you-may-call-it of the government," vouchsafed Mrs. Brown. "We took the United States consul with us. The secretario of the foreign affairs department of this one-horse country, as I think he called himself, and several other mulatto gentlemen were present.

"We informed them, through the consul, that we had come to attend the sale of the H. T. P. Company's property, according to law. They chattered among themselves and looked in a lot of books. Each appeared to be a bigger fool than the next one. We were informed that there was no tax on record against us."

"But Don Josephus lives at the capital, you know," said Honk. "It may be that you went to the wrong place. Perhaps you should telegraph—"

"No. We went to the right place. They admitted that there had been such a tax levied, but said that it had been canceled. Further than that, they either couldn't, or wouldn't say. It is a mysterious business. We've been virtually swindled out of the property."

"I'll venture that Addicks—" began Honk.

"Pardon me," said I, from the window overlooking the harbor. "A long, low, slate-colored vessel that looks like a steam-yacht just warped up against the wharf a few minutes ago. Could it be anybody we're not expecting? I also notice Addicks and Captain Tuttle coming this way across the plaza. You ladies were supposed not to meet him."

"Botheration!" said Mrs. Brown. "We can't be eternally running from that man! Come, girls. We will go into the next room and close the door. And remember!" she waggled a warning finger, "we shall be listening. Govern yourselves accordingly!"

Captain Tuttle bore under his arm the inevitable tin box.

Addicks appeared to be in a remarkable state of mental exaltation from some cause or other, evinced by his flushed face and sparkling eyes. Something had happened that was entirely to his liking, doubtless. I glanced out the window from force of habit.

"Aha!" I sung out. "Also *hola!* and *ohe!* Four men approaching off the port bow to board us! Shall we lower the portcullis, Lord Belwether?"

Honk reconnoitered.

"Stringfellow and his gang, by cricky!" he exclaimed. "Now for the explosion!"

Addicks grinned in an altogether fatuous and dreamy fashion.

"Ahem!" coughed Tuttle. "P'raps I'd better withdraw for the present. I'll step into the next room."

He opened the partition door, walked in, and—without waiting to turn around, backed right out again.

If I'm any judge of physiognomical phenomena, I'd say that his face depicted horror, superstition, disgust, relief, and a kind of grim, saturnine satisfaction. By that time there was heard the tread of marching feet on the stairs. Escape was cut off. Captain Tuttle folded his arms over his tin box and waited.

Stringfellow, sleek and self-possessed; Latham, blond and beaming; Cabell Kingsland, no less well-groomed and gracious, entered jauntily.

Ah, thought I, the same suave, smiling scoundrels who had laughed at Honk and me! It was our turn. I rubbed my hands in anticipation.

"Ah, gentlemen," murmured Stringfellow, nodding to all and blinking at us with his yellow cat's eyes. "How goes the game? Business seems rushing, from indications outside. Ships in the harbor—hurry and bustle in the town. Addicks, you're looking well—"

"Can't complain," said Addicks serenely. "I s'pose you all are here as a result of Toomey's cable?"

"Um! No—we received no cable. We came, in fact—but what's up? Anybody making trouble? By the way, how about the minority people? I presume they're all safely tamed and ready to eat out of the hand, ere this—"

The inner room door creaked slightly as it swung back. In the opening the flushed and angry face of Mrs. Brown shone like a harvest moon. Stringfellow shrank back, with a look of horrified

surprise, instantly replaced by one of anxious inquiry, and—oh, half a dozen other mixed expressions. I made ready to laugh, but didn't.

"Marian!" he cried. "You here? Wh-what does this mean?"

Mrs. Bro—Stringfellow came forth trumpeting. "What does it mean, is it? It means considerable, Jotham Stringfellow! We're the minority people, are we? Safely tamed to eat out of the hand, eh?"

The other ladies came from behind and stood scowling defiance.

It was Latham's and Cabell's turn to do some exclaiming.

"Elinor!" from Latham.

"Clarissa!" from Cabell.

"You the minority stockholders" stammered Stringfellow—"I—I can't understand. Er—ah—Cushing represented to us that a syndicate purchased the shares."

"We were the syndicate, sir. We bought the stock to help Archie get started in his broker business. He has repaid us by coming down here and falling in love with one of these mulatto girls, too, the ingrate! But that has nothing to do with your villainous schemes to rob us of our money—"

"Tut, tut! Marian, haven't I warned you many times about dabbling into things that you know nothing about? I've no doubt you led the others into it. Now, you—"

"Now I what?" thundered his wife. "You unscrupulous wretch! Don't dare to criticize me! You and your thieving company—with your robbing and plundering of helpless women and orphans! How dare you? Oh, I shall lay hands on you in another minute!"

My attention was diverted to Captain Tuttle. He placed his tin box unostentatiously on Honk's desk. His honest face was lighted by a smile of surpassing effulgence. Exquisite enjoyment of a long-deferred revenge transfigured him. The fact that his enemies were married to each other seemed to strike him all at once as being sufficient punishment. He stepped softly from the room.

"That was Edgebert Tuttle," said Mrs. Stringfellow. "*He* is an honest man. I might have married him one day, if I had been gifted with the sense of a goose; but I chose a captain of finance instead. Humph!"

"Well, how much are you out, Marian?" asked Jotham P. meekly. "Maybe we can save something from the wreck."

"Out? We're not out anything. We've made money! Lots of it! Thousands and thousands of dollars! Out? I want to know! Thanks to Mr. Simpson and Mr. Addicks and Mr.—well, a number of others."

"Then what's the controversy about?"

Another interruption? Yes. It was our busy day at the bungalow.

Enter Aunt Beverly-Travis accompanied by—our leading juvenile. They were a little tardy.

"Oh, dear! May we come in?" asked Miss Vandiver prettily.

Kingsland, beaming with recognition, sprang forward with marked haste.

"Why, who would have dreamed of seeing you here?" he effused. "How nice! Fanny Vandiver, of all people!"

But Aunt Beverly-Travis obtruded herself adroitly and received the brunt of the attack.

"Oh, no, you don't, Edwin Kingsland!" she laughed merrily. "You may flirt with me if you like, but this is—Mrs. Lon J. Addicks, if you please, since nearly two hours ago."

"Gracious me!" said Mrs. Stringfellow. "Married to a poor man with nothing but a salary!"

"My dear Marian," interposed Jotham P. mildly. "There is some mistake somewhere. Four months ago or thereabout we disposed of all our rights, title, and interest in the Honduras Tropical Products Company to Mr. Lon J. Addicks for cash in hand. Unless he has since disposed of it, he owns the controlling interest in a million-dollar corporation, which, according to your statement, is well established and on a paying basis."

"I want to know!" she said. "Then, Mr. Lon J. Addicks, you are the man who squelched that tax-title."

"H-m—yes. I believe there was something of the kind," drawled the culprit. "You see, it would have been all right for—er—Mrs. Addicks, but where would I have been? I had to pay it—or—er—arrange the matter to protect myself."

(The end.)

By the Light of the Lantern

Ask us what you want to know

WE want to be as useful as possible to our readers, but, because of the great popularity of this department, we are obliged to impose certain restrictions. It is limited to the answering of questions of an informative, technical, or historical nature only. Letters concerning positions WILL NOT be answered. All letters should be signed with the full name of the writer, as an indication of his good faith. We will print only his initials. The editor begs that readers sending in questions will not be disappointed if the answers do not appear as early as expected. Delays are often unavoidable for two reasons: the magazine is printed two months in advance of the date of issue, and it frequently takes weeks to secure correct answers, owing to the complexity of the questions.

J. J. D., Winnipeg, Canada.—The length of the main line of the Canadian Pacific, Montreal to Vancouver, is 2,909 miles; that of the Transsiberian is 5,261 miles, Vladivostok to Moscow. The train on the Transsiberian road runs through without change of cars, the time being about ten days, and the average speed twenty miles per hour. This is, of course, the longest run in the world.

(2) Can't say exactly just where the Canadian Pacific Mallets are distributed.

F. A. P., Yonkers, New York.—Write to the Secretary of the Interstate Commerce Commission, Washington, District of Columbia, for a copy of the ruling on railroad passes. We are quite sure, however, that the restrictions on the issue and exchange of passes still remain in force.

(2) It is not customary for the Pullman Company to issue passes, except quarterly or annually to the officers of the road over which they may be operating.

T. M., Jersey City.—There is no record of the longest train ever operated by straight air; that is, none which can be accepted as authentic. The non-automatic, or "straight-air" brake was invented by George Westinghouse in 1869.

WHAT is the difference between dry and wet steam?

(2) Which are eight fastest trains in the United States, and their time?

(3) What is the speed of engine No. 303 of the Philadelphia and Reading Railway?—P. M., Hoboken, New Jersey.

(1) Wet, or properly saturated steam, is that with just enough heat to keep it from condensing. Dry steam is practically saturated steam, but usually that which does not have over two per cent of entrained water. Superheated steam is that which has been heated when not in contact with water, and hence has a higher temperature than saturated or dry steam at the same pressure.

(2) For full list see the Lantern Department of the March, 1912, RAILROAD MAN'S MAGAZINE, page 280.

(3) It is capable of a sustained speed of at least 60 miles an hour with the five and six car trains run by that road on its New York division.

F. P., Detroit.—Your friend was no doubt correct in the statement that the "Flying Scotchman" between London and Glasgow had made 90 miles an hour, as the writer timed it at that speed more than once, but if he meant to imply that the Scotchman had made the entire run of 400 miles between the two places at the average rate of 90 miles an hour, the statement is, of course, absurd. The time is practically eight hours, and therefore the average speed is 50 miles per hour, including stops, of which there are very few, and only for the purpose of changing engines. This is a long-distance train, and it would be hard to improve on the average.

L. L. J., Birmingham, Alabama.—You might try the Rand McNally Company, New York City, for the map, but we can't say whether or not one is published on so comprehensive a basis.

(2) "Poor's Manual of Railroads" goes thoroughly into all details of the information which you desire.

(3) In the article on "Combustion and

Firing," by Robert H. Rogers, which appeared in the August, 1911, issue of the RAILROAD MAN'S MAGAZINE, will be found a complete description of the oil-burning locomotive.

(4) The San Pedro, Los Angeles and Salt Lake does not appear in the official guides as one of the so-called Harriman group.

(5) The Northwestern Pacific is independent of the two systems named

(6) Consult "Poor's Manual of Railroads" for the double-track mileage of the roads you mention

R. W. H., Everett, Washington. "Train Rules and Train-Despatching," by H. A. Dalby, is the book you want. It can be procured from the Norman W. Henley Company, New York City

C. J. M., Charleston, South Carolina.—The best way for you to obtain information at first hand regarding the affiliation of signal and towermen with labor organizations would be to inquire from any one of them in your own city. This will also give you an opportunity to find out the working hours. In order to explain this intelligently here it would be necessary for us to quote the entire portion of the hours-of-service law which applies to their work

J. H., Pasadena, California. The vastness of the Pennsylvania Railroad system and the number of people dependent upon it, is indicated in a report recently issued, showing that on December 31, 1911, it had 25,236.5 miles of track. The number of stockholders on March 1 was 73,567, showing an increase of 7,744 over last year. This does not include the stockholders of the various subsidiaries, nor does it embrace bondholders of the Pennsylvania Railroad Company and its affiliated lines.

The Pennsylvania has 11,503.76 miles of line, of which 6,329.54 miles are east of Pittsburgh, and the remainder, 5,174.22, west of Pittsburgh. These lines run through thirteen States and the District of Columbia, in which live more than one-half of the people of the United States.

The system now has 11,503.76 miles of first track, 3,593.03 miles of second track, 798.41 of third track, and 619.03 miles of fourth track. It has also 8,722.27 miles of sidings. The increase in the trackage during 1911 was 619.92 miles.

The Pennsylvania is essentially an institution of the State of Pennsylvania, and in it are located 4,134.07 of the 11,503.76 miles of line. Ohio is second in Pennsylvania mileage, having a total of 1,932.56 miles. In Indiana the system has 1,659.92 miles of line, while the remainder is divided as follows:

Delaware, 275.34 miles; District of Columbia, 13.02 miles; Illinois, 642.43 miles; Kentucky, 4.07 miles; Maryland, 601.90 miles; Michigan, 439.99 miles; Missouri, 30.78 miles; New Jersey, 780.17 miles; New York, 822.57 miles; Virginia, 77.87 miles, and West Virginia, 89.07 miles.

R. A. B., Moncton, New Brunswick.—There are at least 500 locomotives of the Mallet type scattered on probably 50 railroads, so you can readily appreciate what a large space would be necessary to give their various numbers, dimensions, etc. They are all practically alike basically, the differences between being in tractive-effort, wheel-arrangement, use of superheated steam, etc. They all embody the articulated feature; that is, the two groups of driving-wheels are free to curve independently of one another.

T. M., Jersey City.—Tradition is silent as to the time when the brass and wedge was first used for journal bearings, but the practise is undoubtedly very old, probably extending back to the time of Ross Winans, in the forties, in some form or other. We have been endeavoring to secure this information since the receipt of your letter, but so far have received no replies to our various communications.

(2) Your question does not indicate the road to which the K-2 engine belongs. If you will supply this omission, we will answer in the next issue. So many roads have Pacific type engines at present with the 4-6-2 wheel arrangement designated as "K" that it is impossible for us to conjecture which one is meant.

G. B. M., West Orange, New Jersey.—The editor must confess that he is puzzled by two of your questions, viz., "How may the boiler elevation of the backhead be determined?" and "Please explain the best mode for throttle fastening?" In the case of the first we thought you might mean a description of the best and most accurate manner to locate the gage-cock holes in the backhead, but after a long study concluded to give it up and let you come again. In regard to the other, if you mean the throttle-valve, it is considered the best practise to bolt it firmly to a brace which is riveted to the dome; this, of course, to resist the downward pull when the valve is seated, which would soon move it out of place at the dry-pipe joint. They are all secured in about the same way. If, on the other hand, you have reference to the throttle-lever in the cab, they are now universally fastened by a latch of some four teeth which engage the throttle-rack or quadrant in any desired position. Years ago thumbscrews were commonly

used for this purpose and the throttle-quadrants were not notched

(3 and 4) An erecting-card elevation is the large drawing, sometimes 3 x 5 feet, which is generally placed on a convenient board on the wall of the erecting-shop for the general guidance of the gang setting up the engine. Of course all the parts are covered by detail drawings in addition, but the large one gives a graphic idea of the location of the parts and how the machine will look when completed. The same applies to the erecting-card for cab-fittings, indicating the position of these parts in the cab

(5) The article on "Combustion and Firing," in the August, 1911, issue of the RAILROAD MAN'S MAGAZINE to which you refer, contains the information that you want. Look it up again and note the drawing on page 461. Practically the same draft appliances are used as for coal.

L. L. P., Granite Falls, Washington.—The nearest master mechanic on the Chicago, Milwaukee and Puget Sound Railway is probably Frank Rusch, at Tacoma.

T. H. L., Cleveland.—Train auditors, or collectors, as they are commonly termed in the East, advance from trainmen; that is, they enter the passenger-service as trainmen and later become collectors. They cannot become passenger-conductors, however, without first going through the freight-service.

(2) The leading road of the South, from the standpoint of mileage operated, is the Atlantic Coast line, with 11,405 miles. It is made up of some 14 roads, including the Louisville and Nashville, 4,591 miles, and the Nashville, Chattanooga and St. Louis, 1,230 miles.

(3) The bursting of the air-hose resulted automatically in an emergency application of the brakes, as it disturbed what might be called the perfect balance of the triple-valves which control the admission of air to the brake-cylinders, allowing the air to enter the cylinders in far greater volume than would be the case in an ordinary service-stop.

D. J. F., Providence, Rhode Island.—You can apply to any master mechanic or road foreman of engines of the Grand Trunk Railroad for a position as fireman. You might address J. Duguid, master mechanic, Montreal, Quebec, to learn the prospects of employment at present.

A CAR-LOAD shipment, way-billed from Chicago to Marshall, Minnesota, as agricultural implements, when at destination was opened and found to contain wire nails, marked a hardware firm in St. Paul. On the car being forwarded to St. Paul what charges would the agent there collect? Agricultural implements take class "A" rate from Chicago to Marshall, 35 cents per cwt., and wire nails between the same points take class 5th rate, 30 cents per cwt., minimum weight 36,000 pounds. The car was billed at 24,000 pounds, the minimum weight for shipments of agricultural implements.—D. O., Marshall, Minnesota

The actual weight of the nails should be ascertained at Marshall, and billing corrected to that weight (or 36,000 pounds minimum, if actual weight less) and rate of 30 cents to cover to Marshall. It is not clear why the car for St. Paul is billed to Marshall. If through an error at Chicago, the matter should be referred to the proper traffic official We do not see how this would affect charges, Chicago to Marshall, and, of course, if re-billed, Marshall to St. Paul, the regular published tariff in effect for the actual commodity would be used. In this connection the following clause from a provision of the Interstate Commerce law prohibiting the misdirection of property to be transported may be of interest:

> Any common carrier subject to the provisions of this Act, or whenever such common carrier is a corporation, who, by means of false billing, false classification, false weighing, or false report of weight, or by any other device or means, shall knowingly and wilfully assist, and shall willingly suffer or permit, any person or persons to obtain transportation for property at less than the regular rates then established and in force on the line of transportation of such common carrier, shall be deemed guilty of a misdemeanor, and shall, upon conviction thereof in any court of the United States of competent jurisdiction within the district in which such offense was committed, be subject to a fine not exceeding five thousand dollars, or imprisonment in the penitentiary for a term of not exceeding two years, or both, at the discretion of the court, for each offense.

J. M., Elmira, New York.—The largest engines owned by the Erie Railroad are Mallet articulated compounds of the 0-8-8-0 type, and designated by the railroad company as Class L-1. Their road numbers are 2600, 2601, and 2602. They were built primarily to push freight-trains up the steep grade east of Susquehanna, Pennsylvania, to Gulf Summit, and for some time the three remained there, but now we understand that one has been transferred for similar service on the mountain east of Port Jervis, New York

(2) The Erie Railroad system includes the Bath and Hammondsport Railroad, 10 miles; Chicago and Erie Railroad, 269.56 miles; Erie Railroad Company, 1,993.70 miles; New Jersey and New York Railroad, 47.76 miles;

New York, Susquehanna and Western Railroad, 152 miles, and Wilkes-Barre and Eastern Railroad, 92 36 miles. Total mileage of the system, 2,565 38 miles

If a string of 60 cars was being pushed by one engine and pulled by another, each of equal power, and there was three feet play in the draw-heads, where would the spot of lost motion be?—R. B., Walton, Oregon.

If the locomotives were of equal power, as you say, and the cars with their loading of equal weight, the point of slack should be logically about half way the train, but so many things have to be taken into consideration that it is practically impossible to assign a definite location for it. It would constantly vary, due to the change in grade, variation in tractive-effort of the engines, and many other causes

J. O. H., Long Beach, California.—In the majority of various designs of screw reverse a form of pointer or index is employed to indicate the varying degrees of cut-off. This can be done in a number of ways, but the writer is of the opinion that the standard on the Austrian State Railways is the best. If ten turns of the reverse-wheel are required to go from full-forward to full-back motion, each turn is indicated, and if the figure "5" should appear in the proper place it would imply that the engine was "out of gear," as it would be in the old-style reverse-gear with the lever in the center of the quadrant.

O. H. S., Stanton, Iowa.—Supplementing our reply to you in the July number in regard to brakemen-operators, we have since been advised that the former Denver and Rio Grande Railway, between Ogden, Utah, and Grand Junction, Colorado, hired operator-brakemen in passenger-service about thirteen years ago. They carried box-relays, and crossing the Utah desert, where offices were very few, the company had boxes on telegraph-poles at blind-sidings, closed with switch-locks and containing the despatcher's wire. The correspondent supplying this information, however, is of the opinion that this practise has been discontinued, as increased business has called for many additional offices.

HAVE any locomotives speed-recorders so that the engineer can tell the number of miles per hour he is traveling?—A. A. R., Kansas City, Missouri.

It is practically a universal practise to have these on locomotives hauling fast trains in Europe, but there are only isolated instances where they have been applied here. Abroad, the maximum speed regulations are so strict, being imposed by the governments, that it is necessary to have a certain check or record for each run. The recording mechanism is generally located on the running-board as nearly above one of the engine-truck wheels as possible, and the roll of paper within is revolved by a drive from one of the engine-truck axles. This box is locked, and the engineer cannot obtain access to it. At the end of the run the roll is removed and carefully filed for future reference should any complaint be made regarding excessive speed at points where it is forbidden. There is also a dial or recording-gage in the cab, placed conveniently for the view of the engineer. The German railroads invariably get into trouble whenever a slow-down, where one should be made, is disregarded, and they use the device for their own protection, as well as for that of their men. In this country they are largely considered as an unnecessary and expensive adjunct to the locomotive, although quite a number are in use

E. B., Denver.—Consult back numbers of "Poor's Manual" for the history of the branch road mentioned in your letter. We do not find any record of it in the last few issues of that publication.

(2) The division superintendents of the Nashville, Chattanooga and St. Louis Railway are stationed at Tullahoma, Tennessee; Paducah, Kentucky; Atlanta, Georgia, and Nashville, Tennessee. Address W. L. Danley, General Passenger-Agent, Nashville, in regard to the trackage used by this company.

E. S. M., Worcester, Massachusetts.—Through the kindness of two correspondents we have been furnished with some information concerning the Port Townsend Southern Railroad, which we advised you in the July number does not appear in the official guides. It appears, however, that this is a standard-gage road between Port Townsend and Quilcene, 21 miles, and about 10 miles from Tenino to Olympia, both lines being Northern Pacific property. The equipment is said to consist of one engine, two passenger, and about a dozen freight-cars. One correspondent is of the opinion that at one time the road had its own set of officers and was run independently of the Northern Pacific main-line systems.

M. H., Chicago.—We fail to understand your question in relation to "friction in a locomotive boiler when fired." You state, referring to the old Stourbridge Lion; "the steam was raised at between 40 and 50 pounds, although there was no friction. Would like to know what causes this friction?" The editor is rather inclined to the

opinion that internal friction in the locomotive is what is meant. Authorities differ as to the average internal friction. Wellington gave five to eight per cent of indicated power, and Forsyth, ten per cent. It varies with the number and condition of bearings, coupled wheels, valves, etc., as well as amount of oil used. The old newspaper account of the first trial of the Lion, which appeared in the August issue of the RAILROAD MAN'S MAGAZINE, in which it was stated that steam was maintained at so many pounds, although there was no friction, may probably be taken to mean that the engine had no train behind to detract from its steaming qualities.

H. P., Waycross, Georgia.—Our reply to "C. T. V." in the August Lantern Department relative to increasing the weight of an air-tank or reservoir by increasing the pressure of the air within it, was simply the result of an experiment which was performed with all care that the appliances at hand would permit. Theoretically we agree with you, and might have reasoned it out through the usual well-known formulas as you have done. It was thought better to refer to a practical experiment, because we did not believe that in a tank of the comparatively small size mentioned, 50,000 cubic inches, there would be an appreciable gain in weight, and there was none so far as we could observe in the experiment which we mentioned. Lack of sensitiveness in the weighing appliances at that time may have a bearing on the result. This opinion is held by a correspondent, "J. N.," Lincoln, Nebraska, from whose letter we quote the following:

"The result which you obtained in witnessing the actual experiment arose from the fact that the weighing apparatus used was not sufficiently sensitive to record the very slight additional weight of the atmosphere necessarily forced into the tank to create a pressure of 85 pounds. This additional weight was indeed small, but it was there, and if the weighing apparatus used had been sufficiently sensitive the additional weight would have been recorded and obvious.

"I have not computed the weight of atmosphere that would be involved in raising a tank of 50,000 cubic inches to a pressure of 85 or 90 pounds, but it would obviously be an infinitesimal part of the "square inch" extending from sea level to the highest altitude, but, however limited it would be, it would have weight in exact proportion to the volume used in creating the named pressure, and would show that weight on a weighing device sufficiently sensitive to record it."

Another correspondent, "E. V. L.," New York City, whose kind letter is greatly appreciated, holds that if the tank were filled with air at atmospheric pressure and then heated until the required pressure was obtained the total weight would not be affected. Continuing, he adds; "but if the pressure is obtained by compressing free air, then this would require 239,000 cubic inches of free air. As free air at 60 degrees at the sea level weighs one pound per 13.06 cubic feet, this is equivalent to an addition of 10.14 pounds to the total weight."

J. E. B., Greensburg, Pennsylvania.—If you will give a more accurate description of the rubbish which you notice being unloaded in the Pittsburgh district by the railroads, we will be very glad to reply to your question. It may be their own scrap, although your letter does not say so, and this, of course, is sold for what it will bring. Slag is hauled by the railroads at freight rates governing such material.

C. McC., New York City.—The loss of an eye bars a man from any position, practically, in railroad service. It would simply be a waste of time to apply for a road job after meeting with that misfortune. The requirements are fully described in an article on railroad eye tests which appeared in the September number of the RAILROAD MAN'S MAGAZINE.

W. G., Worcester, Massachusetts. — We have been informed that work has been started on the bridge mentioned. Address Alex. C. Shand, chief engineer, Pennsylvania Railroad, Philadelphia, who will no doubt advise you just what has been done.

I. C. F., New Orleans.—The Cold Blast Transportation Company has 2,000 cars. The principal officers are as follows: F. Sulzberger, president; M. J. Sulzberger, vice-president and treasurer; N. Grabenheimer, secretary; and M. S. Loeb, assistant secretary. Their address is New York City. Those stationed in Chicago are E. B. Zitzinger, purchasing agent; V. D. Skipworth, manager, and A. F. Peterson, master car-builder. We are unable to answer the intimate question concerning this company.

A. C., Barton, Maryland.—Your problem has appeared in various forms in the RAILROAD MAN'S MAGAZINE, and it may be briefly answered in the statement that shots fired on moving trains have precisely the same effect as though fired on the ground. The two men, the rifle, and the bullet are all moving with the speed of the train, and there is nothing to prevent the bullet from reaching its mark.

SAVING THE WORKER.

Many of the Appliances Now in Use Where Men Are Employed in Dangerous Trades Are the Inventions or Ideas of the Men Themselves.

BY J. D. NYE.

I HAVE selected the various mills of the United States Steel Corporation as the basis of this article, because that corporation is one of the largest employers of labor in the country, and because it has made a special effort to encourage men to suggest plans that could be used for their safety, and has put those plans into practise.

In the United States Steel Corporation, however, the official organization of the work of safeguarding employees is comparatively recent. In its present form it dates back to March, 1908, only, although prior to that date the corporation's subsidiary companies, working more or less independently for a long time, had taken steps to prevent accidents by means of safety devices and instructions to workers, a casualty manager being appointed by each company to supervise the work.

After the work had been in progress for a year, the general solicitor of the corporation called a meeting of the casualty managers to consider the results of their work and formulate plans for the future. At the meeting, Judge Elbert H. Gary, chairman of the board of directors, said:

"There is not any doubt that our corporation will promptly and fully approve every suggestion that is made for the betterment of the safety conditions of our men, provided the recommendations seem to be practicable. If the only question involved in them seems to be that of dollars and cents, we will not hesitate to make the necessary appropriation in money to carry into effect any suggestion for taking care of our employees."

The outcome of the meeting vindicated Judge Gary's utterances. A committee of safety was appointed to inspect the various plants and works of the subsidiary companies and to act as a clearing-house in obtaining information concerning the safety of the men in its employ.

The committee of safety was instructed to select inspectors, who were to make written reports on the conditions of the different plants with reference to the prevention of accidents. These reports, after being passed on by the committee, were transmitted to the proper representatives of the companies, with a request that returns might be made within a period fixed by the committee, showing what action had been taken on the reports.

The committee got busy. It chose as inspectors men familiar with the machinery and operations of the various companies, experienced in matters and conditions connected with accidents and competent to detect sources of danger and devise means of overcoming them.

All Dangers Were Considered.

Each building was considered separately. Not only were the larger but the smaller dangers noted. Worn floors; carelessly piled material; windows that should be cleaned so as to give better light, and loose planks that invited a fall were among the lesser dangers noted.

By 1910, the committee had seventy-eight of the largest subsidiary companies thoroughly inspected. It had received and considered no less than 5,200 recommendations made by the inspectors. More than ninety-two per cent of these recommendations were accepted and complied with by the subsidiary companies. Less than eight per cent required additional discussion.

But the inspectors were not alone in the work. More than seventy-five suggestions for plans for devices and appliances for safeguarding machinery, warning employees, and otherwise preventing accidents were received independently from the companies. Many of these suggestions were accompanied by blue-prints, photographs, estimates of cost, and other information. A majority of these devices were subsequently used.

As has been said, the subsidiary companies acted independently so far as the actual form and installation of the safety appliances were concerned, accepting the advice and instruction of the safety committee.

This committee is now endeavoring to standardize all safety devices now in use on machinery common to a majority of the plants. It is thus hoped to insure the use of only the most effective devices.

The committee of safety now consists of Charles McVeagh, general solicitor of the United States Steel Corporation, chairman; G. M. Cooper, American Bridge Company; J. L. Chisholm, Tennessee Coal, Iron and Railroad Company; Thomas Ewing, National Tube Company; L. H. Burnett, Carnegie Steel Company; S. W. Tener, American Steel and Wire Company; E. H. Windom, Oliver Iron Mining Company; R. J. Young, Illinois Steel Company; and C. L. Close, secretary.

Mr. Close formerly represented the National Tube Company on the committee, but has been transferred to the service of the corporation and attached to the general solicitor's office as manager of the bureau of safety, relief, sanitation and welfare.

There are also safety committees in almost all the subsidiary companies, these being known as permanent committees and workmen's committees. The first is made up of the superintendent, master mechanics, and heads of departments; the second consists of three members of the rank and file. The second committee is allowed time once or twice a month, or, in some cases, once a week, to make a thorough inspection of the plant, during which the members are paid their usual rate of wages

The duty of both committees is to look for defects in buildings or equipment, unsafe practises of workmen, and any other condition of men or machinery that might cause accident.

The make-up of the workmen's committee is changed frequently so as to give a majority of the employees a chance to improve conditions. It is understood, however, that when they cease to be committeemen they shall not allow their interest in the safety movement to cease also. Consequently a goodly proportion of practical suggestions come from former members of the committee.

"Suggestion Box" for Men.

The committees also investigate serious accidents; examine witnesses, report on negligence, and suggest the punishment.

One of the unique features of the safety movement is the "suggestion box" that is placed outside the entrance to all the plants. Into these boxes the men drop written hints or plans for adding to the safety equipment. If any are found to be practical, the man making the suggestion is paid.

Money talks in this safety scheme just as it does in all business affairs. Since 1908 over $3,000,000 has been expended for safety by the corporation. Since

1911, $1,750,000 has been spent. The results have warranted the disbursement. In 1911 there were forty three per cent less accidents than in 1908, and the indications are that the current year will produce a better showing

It must be remembered that the number of employees is increasing annually, so that forty-three per cent really doesn't represent the present situation. To-day there are about 200,000 workmen on the pay-roll of the corporation.

Apart from the safety devices for machinery, the workers are surrounded with sanitary precautions of an elaborate nature. There are spacious baths; ventilating devices; "change" houses for the street clothing of the men during working hours, and in which they can wash up when the day's labor is over; hospitals with corps of trained nurses, a staff of doctors, and a full equipment of operating, reception, and examination rooms and dormitories.

So many suggestions for safety devices have been received by the corporation that it has not been easy to make a selection. There are thousands of these devices covering every conceivable phase of danger, many of them being remarkable combinations of ingenuity and simplicity

Indeed, some of the most effective are among the simplest

A ROUNDHOUSE DERAILING SWITCH. BEFORE REACHING THIS SWITCH AN ENGINE MUST STOP AND FOREMAN MUST HOLD THE SWITCH CLOSED FOR ENGINE TO PASS. WITHOUT THIS DEVICE AN ENGINE OR TRAIN NO. UNDER CONTROL MIGHT RUN INTO THE TURNTABLE PIT.

The first thing to be put in use was a danger "trade-mark." This is a red ball. Time was when danger points were protected by written warnings in several languages, including those of the Slavic nations, but it was found that many foreign workmen were illiterate, and the warnings were useless.

Universal Danger Signal.

The red ball was adopted as a significant and permanent sign of danger, and it has worked admirably. Not only is it used in this country, but it has been suggested for use abroad in the hope that the crimson sphere may become generally recognized as a signal of warning

throughout the manufacturing districts of both Europe and America.

An amusing instance of this fact was recently noted in Austria. An American purchased several boxes of matches on which was the red ball, with the statement that there was no danger in purchasing that particular brand of matches!

Wherever it is necessary to expose a live wire in the steel plants, a sign is hung under the wire on which, in vivid red, is pictured Jove's hand holding a sheaf of thunderbolts. Below the hand is the word "Elektrika," and beneath that a skull and cross-bones.

No matter how unlettered an employee may be, this sign is sufficiently significant, and its grim hint is understood. So well is its meaning understood that on one occasion the applicants for employment at one of the plants carefully kept away from an iron hand-rail in front of the window of the employment bureau.

An investigation showed that one of the clerks had placed an "Elektrika" sign in the window above the rail to keep the sunshine from his desk!

There are many lettered signs displayed outside and inside the various plants that play their part in the reduction of accidents. Over the gates of certain works is the sign

SAFETY! It pays you to think before you act.

This illuminated sign is affixed to another gate-post

The prevention of accidents and injuries by all possible means, is a personal duty which EVERYONE owes not only to himself alone, but also to his fellow workmen.

In other instances you are reminded

The careful workman is the efficient workman. He who prevents an accident has done a good day's work.

The change is rung on the same subject in hundreds of different ways.

Apart from the red ball, every plant is supplied with enameled steel signs on which, in flaring red, is inscribed a "danger warning" in half a dozen languages. A typical sign of this kind reads as follows:

DANGER! You are warned against working without eye-protectors or with battered tools. Get proper tools and eye-shields from foreman.

The same sentence is repeated in the other languages, some foreign words for "danger" being "*nebezpecno*," "*v ocly*," "*opanzno*," and "*niebezpeczens two*."

A sign that plays a prominent part in the safety scheme tops a light metal stand. It reads:

Danger! Workmen overhead!

It is so constructed that when not in use the wording of the sign drops out of sight.

When a man enters a boiler to clean or repair it, he slips over the valve-wheel

TRACK TARGET FOR NIGHT AND DAY SERVICE. A.—TRACK DISK PAINTED RED WITH OUTER RING OF WHITE. D.—CLAMP FOR SECURING TARGET TO RAIL. E.—PADLOCK ON LANTERN TO PREVENT REMOVAL

a hinged metal case painted red and which is locked on by a padlock *owned* by the man. The padlock has a metal tag on its red background on which is painted in large letters:

Danger! Man inside!

All boilers are numbered at the front and rear, and the crown-valve is numbered correspondingly. This prevents any one locking or operating the valves.

The railroad safety devices are many. There is a roundhouse derailing-switch by which a locomotive must be stopped before it reaches the switch which the fireman holds closed while the engine passes. Without the switch, the machine might run wild.

Simple and Effective Devices.

When blasting near [illegible] tracks is necessary, there is always a possibility that a spark from a locomotive or a steam-shovel may cause a premature explosion, so a shield has been devised which precludes all possibility of accident. This shield entirely covers the can of explosive.

Sometimes a train has to use tracks that run through mills where the clamor of machinery is deafening. In such cases the bells of the engine are located close to the rails, so that their warning notes are rendered much more distinct than if a bell was in its usual position on the top of the boiler.

Where cars are stalled, accidentally or purposely, an ingenious track target is used. It has a clutch that grips the rail in front of a car. At its upper end is a disk that shows red by day and a red light by night. It is as easy to handle as it is effective.

There are several good rubber devices to prevent a man from getting his foot jammed in the frog of a switch.

A track "skidder" with target attachment is also used as a temporary bumping-block. It is extremely simple so far as its details are concerned, but very effective.

The flat cars that transport open-hearth charging-boxes from place to place, are equipped with end boards to prevent the boxes or their contents from falling over the end of the car onto the rails. In addition, the cars are fitted with steps, grab-irons, and operating levers, all intended to increase safety.

BELL PLACED CLOSE TO TRACK SO AS TO BE HEARD MORE CLEARLY WHEN TRAIN IS PASSING THROUGH A NOISY MILL.

All the switching engines are fitted with steps forward, to prevent the dangerous practise of swinging upon the pilot when the engine is in motion. Since the introduction of these steps coupling accidents have shown a material decrease.

A car-shifter with a steel heel that "bites" the rail with practically no slip, is in general use in the yards. About fourteen inches from the upper end of the handle a steel disk is welded. In case the bar should slip or turn and the man be thrown forward, this disk provides a stop that prevents injury to his hands.

There is a trestle in the Carnegie Works, the equipment of which is char-

acteristic of the efforts being made to protect the workers.

There is a foot-walk on both sides of the trestle provided with a standard hand-rail and toe-board. On the standpipe ladder is an expanded metal shield to prevent the men from touching the high-tension wires.

Across the track is suspended the "telltale" to warn trainmen that there is no "top clearance" at the entrance of the boiler-house. Metal shields stay employees from climbing down the high-tension poles from the trestle foot walk. On all these poles are painted in red the words:

Danger! Live Wires. 6,600 Volts. Keep Off!

There is also a white box around the guy wires to prevent men from being injured at night should they come in contact with the wires.

Must Protect Men From Themselves.

Inside the mills are the carpenter-shops, but the rip-saws are giving out a subdued hum instead of their usual noisy buzz.

Each saw is metal-jacketed, with just enough open space below to insert the wood on which it is to "chew." No whirling menace of angry teeth! A baby might safely play with the humming thing.

All belt-pulleys are encased in metal netting, and there are automatic devices for shifting the belting. The days of arms being lopped off by the toothed disk have passed.

Here is a tempering tank. The water it contains is still steaming from the last immersion of hot metal; but a metal hood shuts over it, in the center of which is cut a narrow aperture through which can be thrust small articles. The whole hood can be turned back so as to leave the entire surface of the tank available.

This hood prevents a careless worker from stepping into the hot liquid.

No small proportion of the work of safety committees is to protect the men from themselves. Most of the safety devices must be automatic. If their operation were left to the employees, the results would be the reverse of satisfactory. This statement is made on the authority of men who are constantly engaged in safety problems.

One feature of the machinery shops that strikes a visitor is the apparent absence of wheels and belting. In the pattern-shops of the Ensley Works not a wheel of all the massive machinery is visible, although the air is filled with their roar and rumble.

Solid metal shields are built over gears, pulleys, and belt-driven planers. They give no outward indication of the tremendous machinery they imprison. You may lean against or loiter among whirring wheels and spinning belts with just as much safety as if you were lounging at home.

Enter the Carnegie Steel Company's works and study the steel-wheel roll-gears which have had the guards removed to furnish a good view of the concealed machinery. The massive system of wheels and piston-rods thus revealed is appalling when one thinks of the accidents they might be responsible for. Now the guards are put in place, and, lo, one could take a nap where a moment before he was in danger of being turned to mince-meat.

The big emery-wheels in many of the plants, and which usually run at 6,000 feet rim speed, are fitted with safety collars. In the event of centrifugal force causing the bursting of the wheel—a not uncommon happening—the fragments are held together by the collar instead of scattering disaster.

Caging the Dangerous Cogs.

The hand-jib crane-gears from which the guards have been removed, show an array of grim, cogged, men-manglers that gleam menacingly as they swiftly revolve. Now the guards, stout metal boxes, are replaced, and there isn't even a visible suggestion of the hidden danger.

The small shop lathes are collections of bristling, projecting wheels, belts, and points so arranged, it would seem, to catch and crush the unwary. Before being put into use they are transformed from potential hospital fillers to harmless machines.

The huge coupling, countersinking and recessing machines, ponderous threading machines, metal planers with

plates covering their cellars so as to prevent injury to workers, high-speed "chucks," rubber mixing rolls, sawguards of many designs, die-grinders and other danger-clearing devices are all covered to save life and lessen accidents unguarded. Old workmen tell grizzly stories of victims being caught and chewed to death by the pinions or the sprockets. To-day such ghastly happenings are altogether impossible, as guards incase the revolving machinery.

GUARDS IN FROG TO PREVENT A MAN GETTING HIS FOOT CAUGHT. THESE GUARDS, A, ARE MADE OUT OF SKELP STEEL, CUT, BENT, AND SECURELY FASTENED INTO PLACE. C, SAFETY RAILROAD GATE WHERE TRACKS CROSS.

In some instances, mostly in the lighter machinery, the solid metal guards are replaced by those of metal netting. The reed lathes are good illustrations, their gearing and belting are enclosed in "cages."

Here are the gigantic heating furnaces. In front of each long rows of sprocket wheels and their chains turn ceaselessly. In other days both were unguarded. Old workmen tell grizzly stories of victims being caught and chewed to death by the pinions or the sprockets. To-day such ghastly happenings are altogether impossible, as guards incase the revolving machinery.

In the mines of the corporation are to be found a multiplicity of devices for protecting life and property. If the cables of the lifts or cages should break, safety "dogs" are immediately released. They fly out and engage clutches on either side of the cage, arresting the fall.

When a car of ore is wheeled into the cage, automatic "chocks" rise from the flooring and hold it firmly in place. As

the cage begins to move, high doors at either end automatically close

Special provision is made to protect cranemen. A safety chamber forms part of each crane. It is built of steel, lined with asbestos, and has a concrete floor. Its door swings easily and closes automatically

In case of trouble, the craneman can take refuge inside and escape fire and poisonous gases. The chamber is ventilated by means of a pipe leading through its roof. It has a small mica window and an arrangement by which the occupant may operate the crane

In cases in which electricity is the motive-power of a machine, a safety rope is attached to the electric switch. Pulling this rope shuts off the "juice" and stops the machinery

The locomotives used in connection with lifting or wrecking cranes are fitted with a device that gives instant warning when the weight on the crane threatens to topple over both crane and engine.

The apparatus consists of a U-shaped tube, the ends of which are closed by rubber stops through which pass steel points that are connected with an electric bell. At the lower part of the tube, two other steel points enter it; these, in turn, being wired with the bell.

The tube contains mercury which scarcely touches the steel needles. If the engine begins to tilt, no matter how slightly, the mercury follows the movement, connects with one of the points, closes the circuit, and sets the bell going. The engineer has sufficient time to avert the threatened danger.

A limit-switch for electric overhead traveling cranes prevents "running the blocks," in which event the cable would break and the load spill on the workmen. After the switch has stopped the hoist, the load can be lowered without readjustment of the switch.

SHIELD TO PREVENT THE SPARK FROM A PASSING LOCOMOTIVE OR STEAM SHOVEL SETTING OFF GIANT POWDER WHEN THE HOLE IS BEING CHARGED

When Handling Hot Metal.

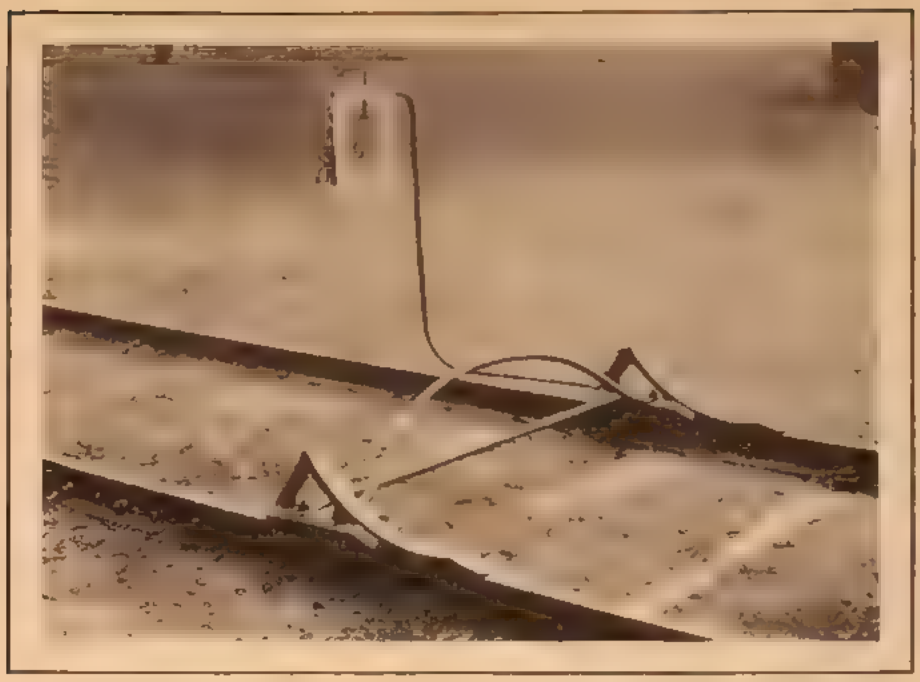
An ingenious "push shifter" is used for tight and loose pulleys, making it impossible for the belt to work from the one to the other and start a machine unexpectedly. Many accidents were due to "wandering" belts prior to the introduction of the shifter

What is known as the Patton Safety Device is in general use in the smelting works. The intention of the device is to prevent the lowering of the boom of a hot metal-ladle below the pouring position, thereby avoiding the possibility of the ladle coming in contact with the molds either by absence of power or carelessness of the operator

The old plan of taking by hand ground material from a revolving muller or mixing pan while the pan was in motion, led to a number of bad accidents.

A modern safety device for this work consists of a hinged gate. When not in use this gate rests on the outer edge of pan. When, however, it is necessary to "trough" the wet material, the gate is forced inward by means of a hand-wheel and screw. Forming an angle across the path of the material, it forces the latter out of the gap in the rim into the wheelbarrow below.

Metal grille is used extensively in connection with bins and hoppers to prevent men falling into the coal and limestone when the bottom of a car is open.



TRACK SKIDDER WITH TARGET ATTACHMENT. THIS DEVICE GIVES THE SAME WARNING AS AN ORDINARY FENDER AND ACTUALLY STOPS A MOVING CAR WITHIN FOUR FEET, RUNNING AT A SPEED OF ABOUT SIX MILES AN HOUR

In the wire-working works, a simple but effective arrangement prevents injury to workmen who are accidentally caught on the blocks. The wire is passed through a hoop in the head of a safety lever so that a snarl will throw the lever over and stop the block.

A safety rope is attached to the lever, carried above the frame, and down the side of the block. If a workman should be caught on the block, a pull on the rope will stop the machine.

That useful vehicle, the wheelbarrow, is found in large numbers in most of the mills and plants. The barrowmen often have to enter narrow passages or pass other barrows. In both instances, there is danger of scraped knuckles and broken fingers. To prevent such troubles, rounded metal guards are slipped over the upper and outer parts of the handles.

Where rods of metal, hot or otherwise, are being handled, large, oval-shaped pieces of leather are slipped over the palms of the hands. These are kept in place by a broad thong at the back of the leathers, but if one of the leathers should happen to get caught in the gearing or belting, the instant freeing of the hand from the thong might be a matter of great difficulty.

To obviate such accidents, the thongs are attached to the leather guards by spiral springs strong enough to keep the hands in place, but able to free them if given a vigorous tug.

The sides of beams and floors through which elevators travel, are beveled and sheeted with metal to prevent a man's feet from being sheared off by the elevators.

A safety car-wrench, invented by an employee of the Larain Works, is in general use. It is designed for the discharging of the contents of drop-bottom cars, and is constructed with a hinged joint.

If the shaft of the wrench starts to revolve on account of the pull of the dropping door, the hinged portion flies around, and, without pulling, releases the handle from the user's hands without giving him a jolt. The handle is offset so that a man's hands will not strike the car during the operation, while the hinged head is double in order that it may be used on winding shafts that turn either to the right or the left.

This wrench will fit several sizes of square shafts. Its use does away with many accidents due to the ordinary wrench.

Many grinding and finishing operations create such showers of steel chips that the workmen are required to wear goggles of thick glass or mica. Since this rule was enforced, many men have been saved from blindness. In the possession of the Central Safety Committee is a photograph of dozens of cracked or smashed goggles, each of which represents a worker saved from an eye-injury.

Another device for protecting eyesight is a burlap screen mounted on a portable metal stand. This screen is placed in front of a workman who is, say, chiseling off the rough edges in a casting. The burlap catches and retains the steel chips that shower about him.

The men who work at the mill-rolls wear a veil of steel netting that suggests the chain face-armor of a Norman knight. This veil protects a man's face from flying sparks when the steel is rolled.

All step-ladders are equipped with hinged and corrugated hard rubber or metal feet so they will stand firm on the smoothest surface. They are so built as to be square to the floor no matter at what angle.

In line with this device are the overhead trolleys used by window-cleaners. Some of the mill-rooms have glass roofs to let in all possible light. These windows must be kept clean. Tall ladders with buckets slung to their rungs would be dangerous. Small aerial railways are built close to the glass. On the railway are light cars for the window-cleaner and his cleaning necessities.

A clever but simple safety hook for hoisting-cranes is in general use. This hook is to prevent the rope or chain that is passed over a hoisting-crane from being brushed off or from slipping off. It is in two parts, the lower being an ordinary hook, while the upper, working on a hinge, meets and fits over the nose of the former.

After the chain is put in place over the hook, the hinged section closes over the nose and is locked thereon by means of a sliding square band that comes down from over the shank of the hook and the hinge. Unless this band is removed by hand, it is impossible to open the hook.

A second detector for determining the condition of fly-wheel spokes and generator-wheel spokes is in use in all machine-shops. It consists of two telephonic ear-pieces held in place by a head-spring, which connect with a hand telephone that terminates in a pointed wire. If a suspected spoke should be struck with a hammer at the same time that the wire is resting on it, the spoke, if cracked, will yield a dead sound that is instantly recognized by the expert.

The detector is also used for determining the condition of those parts of a machine that are in motion but which cannot be seen. It is especially useful for testing steam-engine cylinders and valves. Loose bolts on a piston can also be detected by this apparatus. The breaking of a cylinder-head or some other part of an engine can be prevented.

The device is particularly useful in noisy places where the unaided ear cannot locate machinery trouble.

THIRST TROUBLES OF A TRAVELER.

A VALLEY FALLS young man has made his last trip to Atchison for beer. Hereafter he will send for it by the case and have it come by express or freight. The last time he was in Atchison he had a half dozen bottles wrapped up in a paper and lying on a seat in front of him. A young man from Nortonville was in the act of taking a drink out of a bottle of whisky when the conductor came through the aisle, snatched the bottle from the young man and threw it out of the window. The paper on the beer package had become torn and the con, seeing the familiar sign, heaved the beer where the whisky had gone. When the train arrived in Cummings one of the young men aboard thought it would be all right if he had his head out of the window when he took his drink. But just as the train started some thirsty resident of Cummings grabbed the bottle and the last of the liquor was gone. It is said that the smoker of the night Santa Fe on Saturday nights out of Atchison is always "loaded," but that the conductor is equal to the occasion—*Kansas City Journal.*

BOAT-SHAPED TRAIN FAILED AS FLIER.

BY PETER CLAY.

A DREAM of a thousand miles an hour caused one of the most disappointing failures of railroad history. In 1887, when Frederick Upham Adams, the novelist, was a reporter on a Chicago newspaper, he was assigned to interview a certain Mr. McFadden, who had lunged at the limelight by claiming that by the use of a driving wheel sixteen feet in diameter an engine could run from New York to Chicago in less than an hour, or approximately at a speed of sixteen miles a minute. McFadden talked very convincingly to Adams, and the reporter was so impressed that he studied McFadden's theory. It seemed to Adams that if an engine with such drivers might run at an egregious speed, atmospheric resistance would retard it very much. This was Adams's principal objection to McFadden's arguments

Air Pressure an Obstacle.

Three years later, while traveling on the Denver and Rio Grande, the matter of atmospheric pressure was brought vividly before Mr. Adams while standing on the platform of one of the cars He soon afterward plunged into scientific study of the subject, and by 1892 had prepared a treatise on the subject which was seriously received by a prominent Western publisher and issued in book form in that year. Adams's book, "Atmospheric Resistance and Its Relation to the Speed of Railway Trains," was a volume of about nine pages, elaborately illustrated with drawings and charts.

In his work, he argued that pressure of the air was the principal obstacle to high speed of trains, and that it would be useless for inventors or mechanical engineers to experiment with new devices to increase velocity until they had solved the problem of atmospheric resistance. He proposed as a remedy his invention. In his introduction, he said: "The front of my locomotive is modeled like the prow of a boat. From

THE FAMOUS BOAT-SHAPED TRAIN OF FREDERICK UPHAM ADAMS IN THE MOUNT CLARE YARDS IN BALTIMORE MR. ADAMS INVENTED THIS TRAIN TO MINIMIZE ATMOSPHERIC PRESSURE AND INCREASE THE SPEED OF ORDINARY ENGINES TO ONE HUNDRED AND FIFTY MILES AN HOUR.

the front end the tender shades back to meet the lines of the first car. Automatic hoods close the space between. When a train is made up it stretches away from the tender as if it was one car. My invention contemplates a train built as nearly as possible on the lines of an ocean steamer."

Adams thought that a train of such construction would travel one hundred or one hundred and fifty miles an hour without the employment of an engine of excessive tractive-power or steam-pressure. Though less than twenty years ago, his theory engaged the serious attention of railroad men, and, in 1900, the Baltimore and Ohio put such a train into service. It proved to be efficient, but did not attain the predicted velocity and was finally abandoned. It offered no advantages over the ordinary equipment and cost much more. When it was proposed, it was received with utmost credulity by the public, and Adams's disappointment at its failure was very bitter. Atmospheric pressure has not since been seriously considered in train-movement.

Frederick Upham Adams, "Grizzly" Adams as he is familiarly known, was born in Boston in 1859. His boat-shaped train was his first and only experiment in railroading. It cost him just $30,000 to equip the train and try out the idea. That was his fortune, and he saw it vanish in thin air as the train failed to make better time than the ordinary expresses.

Since then Mr. Adams has written many successful novels. He is shown in the accompanying picture standing at the cylinder-head.

IT HADN'T BEEN BUSTED.

The Operator Sprinted Down the Track After the Train While Loquacious Sam Calmly Dusted Off the Order.

BY "THIRD TRICK."

THIS happened at Wewoka, Indian Territory, on the old Choctaw road now the property of the Rock Island system. At the time, twelve hours was considered a short day's work for a railroad operator. I held the day job while Wilson took what hay there might be on the night stunt. It was his custom to come to breakfast about 6.15 in order to talk a little shop with me during the morning meal. He was a good operator, but careless at times.

On the morning in question he came to breakfast as usual, but announced to Auntie Lou, the corpulent colored waitress and boss of the kitchen, that she'd have to show some speed as he had to get back to the depot for a train.

Outside of her own excellent "co'n pone," the most important proposition in the world to auntie was a railroad train. The request to hurry "Mr. Telegrafter's rations" to facilitate the movement of so wonderful a phenomenon, threw her into such a state of bustling activity that she nearly upset the adjoining table and had an all-around and loud-voiced altercation with the rest of the colored help in the kitchen.

We both laughed so heartily at this, that, perhaps, it took the kid's mind off the situation when he left the depot.

We both reached the depot about 6.30. A few minutes later the train showed up. As the engineer whistled for the board, Wilson stepped to the telegraph table.

Thought I had an order for that fellow," he said, "but guess it was busted. "Yes, it was busted, all right," and he gave the extra freight a clear board. While the train passed he stood at the window and I could see he was thinking hard; but he was on the job, and I did not consider it professional etiquette to butt in.

As the caboose passed, Sam, our lengthy and loquacious colored porter came in to finish the job of dusting, which he usually straggled along into three hours' work.

There were only two pigeonholes for blank order books and they were usually pretty well filled. Every morning Sam dusted each book very carefully about a dozen times. As it was early in the day he began on the books.

Sam always told stories while he "worked," even if no one listened to him, and on this particular occasion he carefully drew forth one of the books from the 31 order rack while in the midst of a yarn.

He had just begun to tickle it gently with the feather duster when he suddenly stopped in his narrative and exclaimed:

"Massa Wilson, hyars one of dem odah books wid writin' on it. I musta put dat one in hyar by mistake, dis mawnin'"

Wilson wheeled upon him wrathfully.

"Well, don't dust the writing off it! Let's see it."

Glancing at it only long enough to ascertain that it was the order which "hadn't been busted," he slammed the wondering Sam on the side of the head with it several times and made for the door.

When he struck the track he hit the trail of that tram, now a mile and a half away, all the while flopping both arms up and down like a scared hen, in the hope that some of the crew would see the signal.

"Lawdy!" muttered Sam. "Dat boy has sure gone crazy."

The trains rubbed noses about four miles from Wewoka. As they backed into the town they found Wilson on the right-of-way still reading the order.

WHEN THE TRAIN BROKE IN THREE.

BY CHARLES S. GIVEN.

SOME twenty years ago Engineer Sturtivant, of the Maine Central, was hauling night freight between Waterville and Bangor, with old engine 25.

Had this old machine not been a flier, his adventure would have turned out much differently. From Hermon Center to Bangor is about seven miles, all down grade. As you enter the west yard at Bangor, you swing round High Head Curve and onto the banks of the Penobscot. This curve is sharp, and high above the river. The west yard is about a mile long, down grade, and the lower half is on a curve.

On the inside of this curve was the freight yard. Cars were lined up along the main track, and a man could see only a few feet. Several switchers were always at work. Around the curve, and at the foot of the grade, was the passenger station.

Beyond the train-shed you rounded a curve and entered Exchange Street station, crossing a drawbridge just before entering.

Between Exchange Street station and Penobscot switch, half a mile east, was the eastern yard. Then came the up-grade.

This single track between Penobscot switch and Bangor station was then the most used single track in Maine.

It was just growing light as Engineer Sturtivant glanced back near Hermon Center to see if they "were all coming," when to his dismay he discovered that his train had broken into three sections. The middle section was close behind with no brakeman aboard.

Before Sturtivant was a steep grade. It was up to him to hustle and give the runaways plenty of room.

Opening the old 25, she responded nobly, and was soon rolling them better than a mile a minute. But the heavy middle section was keeping pace with him.

The 25 was doing all she could. When Sturtivant neared the Bangor yards, he was going considerably in excess of sixty miles an hour. Round the curve they swept, with the engine wide open. The whistle was tied down to warn the switchers.

Through the yard went Sturtivant. He was in imminent danger of colliding with a switcher; then, also, there was the danger of an open switch, and the added horror of jumping the track on that curve.

His drivers were only a blur; people near the tracks made haste to get away. On round the curve out onto the street he went, engine still wide open, and the runaways crowding him closely.

Sturtivant realized the danger of a collision with another train. He had gone past his terminal and had no rights on this piece of track.

Suddenly all thoughts of collision with another train must have gone out of his mind, for as he opened out on the straight track toward the drawbridge he saw that it was open to let a schooner pass.

In a few seconds he would make the bridge, so he quietly got down into the gangway to jump clear when the old 25 should plunge into the stream.

He was going a good seventy miles an hour, and the remaining distance was short.

The bridge-tender was the man for the emergency, however. No sooner were the schooner's masts clear than he began to swing the draw faster than it ever went before. Did it get there? Just by a hair!

There wasn't five seconds to spare. Old 25's trucks hit the rails safely as the schooner's stern passed under the bridge.

Through Exchange Street station, through the east yard they thundered—by Penobscot switch and onto the up-grade!

Up the grade they flew, until the runaways had lost their momentum. Then Sturtivant safely brought the head end to a stop.

ROBERT FULKERSON HOFFMAN.

ROBERT FULKERSON HOFFMAN as a writer of special articles and fiction for the RAILROAD MAN'S MAGAZINE during the past six years has placed the railroad man and his work before the reading public in a light so clear, and with a balance correctness of it all. That is a big saying in small space.

Back of these things lies a broad practical training in the dry as-dust technical knowledge upon which they rest. Mr. Hoffman began his wage-earning life as a mill-boy in the rolling

ROBERT FULKERSON HOFFMAN, IRON WORKER, MACHINIST, ASSISTANT GENERAL SUPERINTENDENT OF MOTIVE POWER, AUTHOR OF "MARK ENDERBY ENGINEER"

of shortcoming and high-pressure attainment well adjusted to the unyielding facts that we venture to believe the tie which should exist between these men who dare and endure much and the public, which benefits so greatly and knows so little of the human cost, has been strengthened and broadened by reason of these writings.

We have had an editor's peculiar satisfaction in seeing the color of justice, penetration, and fairness, which are the dominant notes in Mr. Hoffman's work, reflected with unmistakable sympathy in notable conferences of both national and international importance. And when that is said, we have yet to add that throughout his six years of treading the intricate technical fields of this work we have never once been called to defend the technical

mills at Danville, Pennsylvania, where the first "T"-rail was rolled in America. He became, by carefully selected studies and systematic advancement, a locomotive-building machinist on the L. S. & M. S., at Elkhart, Indiana; mechanical engineer of the Atchison, Topeka and Santa Fe, where his experimental and test work fixed a definite value on four-cylinder compounding which is still evident in the designing of locomotives to-day; assistant general superintendent of motive power of the St. Louis and San Francisco Ry., until that position was abolished.

He is best known as the author of the book "Mark Enderby: Engineer," which is held by able critics to be the finest tribute ever paid the railroad life, and by his railroad stories which have appeared in this magazine

The Big, Brown Buckle.

BY ROBERT FULKERSON HOFFMAN.

The Greatest of Blind Perils Against Which No Expert Skill of Railroad Men Can Insure.

"WELL," challenged Hutton, "while you're talking of chances, what's the worst chance a man goes against in this business?"

"If you engine people had to name the topnotcher of 'em all, what would you say? Huh?"

"I ain't engine people, exactly," volunteered Sands, the conductor, "but you've sure got to say fog, if you want to get it right; fog and a tired or retired 'flag.'"

"There's more people than the 'flag' that don't get far from the rear end in a fog," countered Hutton. "But what about a landslide, or a chunk of rail gone out of the main line? What chance has a man got against them?"

"Lots of chances," declared Sunny Acre. "You've got to say a busted boiler while you're firing, if you want my vote. Once in a thousand, mebbe, they'll search a fellow out of the corn-field and find he's able to 'tend the hearing that comes after. But what kind of a chance is that?"

"It's a chance to say he didn't burn the crown-sheet, ain't it?" demanded Hutton, with the grin that bears so many railroad ills.

"Yes, it's that," agreed Sunny, "and for all the good it does him, he might as well stayed in the corn, mightn't he? Huh? If she's cracked open full length on the back, same as a hatched out locust why, he burned the crown-sheet with low water, anyway. Never was a boiler known to go up any other way, by the record.

"What do you say, Jim?" he appealed to Mahalie. "Ain't a working boiler the big chance?"

Mahalie's fingers for a moment ceased their leisurely movement and his eyes turned with a certain anxiety toward his waiting engine. A little, sputtering leak at the throat-sheet was sending up a lazy wisp of steam, and Mahalie hated leaks. The thing had been bothering him in a subconscious sort of way for several days while he ran.

Repeated reports and ordinary tinkering had failed to entirely stop the apparently insignificant leak, and now came Sunny Acre with his offhand discourse on bursting boilers to make Mahalie fully aware that he had really been worried over it; worried more than he had realized among the many bigger chances, and worried more than he now was willing to admit. Yet, deeper, he stifled a sterner dread.

So, he merely hitched himself a little further back on the empty baggage-truck to clear his feet from the drip, drip of rain from the low-hanging eaves of the little Villa Rica station where they sat waiting, and his steady fingers resumed their placid task of untwining a thread of gray from a thread of white in the wisp of cotton waste on his knees.

Ceasing this abruptly, he glanced at his watch, then up to the notch of the pass high above the rise of the tracks.

"Way over the mountains, yonder, and out beyond the Tehachapies," he said slowly, "there's a State where they give a man the choice of being hanged or being shot, if he's deserving it.

"Now, if you fellows were choosing, which would you take?"

"Aw, come off, Jim," urged Sunny. "Don't side-step it that way. Play the game. Ain't it boilers?"

Mahalie waved him off with a smile and moved toward the engine standing rain-streaked and gently sputtering.

"Up there comes our game, Sunny," he said, as the mellow whistle-notes of the oncoming limited rolled down distantly from the notch of the pass. "We'll play it the same as usual, like as not."

"Like as not," agreed Sands, picking up his well-worn conductor's bag, "but don't any of you forget that we'll be chasing fast freight, and more fast freight will be chasing us, till we get onto double track beyond the Soledad Valley. Drizzle up here, fog down yonder till the sun cuts in."

"Tell Hutton," laughed Sunny, moving close away after Mahalie. "Hutton's your fog artist at the rear; Jim and me for it at the front."

"They'll all hit torpedoes and red before any of them get into a hind end that I'm flagging," said Hutton. "Keep your eye on the gun ahead, Sunny, and we'll go through."

"That's what they all say," tossed back the fireman, as he strode confidently to the engine.

The limited glided masterfully to its stop, disgorged its hungry throng of drowsy breakfast-seekers, cut off its throbbing engine, and laid silent and glistening in the rain, as though some deep-water marvel had fled vagrant into the high country and fallen suddenly beheaded.

Under the rare leaden sky of the mountains, the roundhouse across the way sat sullenly and impassively as a great gun-turret on that upper deck of the mountain strongholds, methodically, ceaselessly, yet silently launching its huge projectiles of train far out over the serried ranks of the mountains and toward the western sea.

Into the face of the mere seeming outwardness of that great game which is played, not so much by written book or rule as by the unspoken rule of the instant's need; the great unceasing, deadly game of the railroad, with its unwritten and secret rule invisibly graven upon the swift-fleeting walls of the valley of decision wherein he who runs must quickly and unfailingly read; into the face of this the little group of changing crew had tossed their mites of hardly jest against the changing specter of an ever-present dread.

As the best of their kind have ever done, as the best of their kind will ever do, they made their dauntless bluff against the unknown, and, presently, had gone their way, the way of limited and freight, into the fastnesses of the farther mountains.

In that vast upper rifle-range lying broadly between the great rivers and the western sea, where the play of cannon-balls of commerce is fiercest and the battle never wanes, Mahalie's roaring projectile of engine and train, once swiftly launched from the sullen turret of Villa Rica, went darting, bounding, ricocheting from ridge to ridge, from peak to peak.

Insensibly, it became one of many giant shuttles on the mountains' crowded single track that day, weaving their fleeting figures into the everlasting tapestry of the high country, patterning from it anew, extending, drawing closer the broad mantle of commerce round about a teeming world.

From the sputtering leak at the throat-sheet of Mahalie's engine, while nerves were tense with swift action and the pressure of battle within and battle without was greatest, the insistent waft of steam came up gustily against his face at the cab-window now and then.

For the instant his close-lidded eyes would fall anxiously toward the under curve of the straining boiler, but no touch of his could forefend against whatever of pressing menace lay hidden there; no touch of his hand upon the engine, no word to the laboring Acre at the fire dared lessen a pressure or lessen a chance.

It was not in the game. They were playing the game as usual.

As to that, they had their reward. No bursting roar of steel and steam; no rending death and cruel after-farce of "putting the Brownies on the dead man" was theirs.

The sputtering throat-sheet went valiantly whisking up among the lonely piñon clusters of the hitherto silent mountain-

sides; down across the barren gullies and arroyos; whirling, roaring past the jutting crags of red and green and umber of the crooked cañon of the Soledad where fog lay thick and impenetrable even to the cañon's ragged upper lip and the river sent up its purling voice unheard in the white silence shattered by the engine's sounding cannonade.

Somewhere, hidden in the folds of that white veil, the specter of that great dread which Sands had rated dread of dreads lurked unavailingly. No crash of torpedoes, nor flash of red, nor despairing cry of defeated flagman heralded the plunge of death and flying débris which is the too frequent, haunting nightmare of men who follow the rail. It was not in the game that day.

Out of the level bank of fog and out of the yawning mouth of the cañon, Mahalie's engine shot safely with the limited curling true in its wake.

With increasing roar, as of a greater sureness; with the disturbing leak simmering harmlessly as a purring kettle warming at a domestic hearth; with the fog of the cañon settling safely to the rear upon its hidden chance, the limited took the big rise to Soledad flats and shot over the crest into the broad smile of the rising sun.

In that clear height, the little block-station hovered at the end of double track stretching away like curving sword-blades glinting in the smiling sun. Upon that narrow table-land stretched miles of easy gathering for the limited's hungry schedule. At Mahalie's deep, insistent whistle-call the semaphore-arm held for a moment, extended, motionless, as though in huge and silent benediction.

Then it fell swiftly and sure. The way was clear under that smiling sky.

Without pause, he went speeding, curving out upon the big crescent. The track upon which he ran, the outer track of two, was his beyond cavil or dispute.

No light was ever fairer; no track more firm and true. Yet, his hand went furtively testing from throttle-latch to brake-valve and back to throttle-latch, while he scanned with eager watchfulness the rushing track ahead. Within him was rising that ultimate fear which he would not give up to Sunny Acre's questioning; which he had never yet shaped into words for himself.

While the limited's speed mounted fearlessly under his steady hand from forty, fifty, sixty, up to seventy-mile gait and more, he sat outwardly unmoved, making time amends for the slower pace out of the cañon. Then, with the four-fold line of gleaming steel reeling under and past him, came the embodiment of his secret dread.

Far ahead, where the blue of the sky met the green of the piñons on the rim of the seemingly endless curve, a jutting clot of black pressed newly on his sight. To his trained sight, it quickly resolved into a hurrying dot of freight-engine laboring under a pall of smoke flung low upon the broad face of the mountain.

Each moment of his own breathless flight drove him many lengths toward the freight's rushing advance upon the inner track. Each moment in the later few set out more clearly to his view the long and even line of red-brown box cars curving across the table-land to meet and pass him at a combined speed that reckoned with no obstruction.

Swiftly, the narrowing span between the rushing engines was closing. Tensely, he sat quelling his one great fear, testing vital latching of levers, but lessening not in the least his speed.

In the cab of the freight-engine sat another man as inwardly filled with subtle dread, as calm, as watchful, slackening none of his rushing advance, because slackening is not in that stage of the great game, and the game must be played by the unwritten rule.

While yet there remained a brief span of the open between them, Mahalie saw far back along the curving line of red-brown cars a sudden staggering uplift and subsiding of their level decks.

Briefly he saw it lift heavily, come plunging on and fall again in the hurrying line. Unconsciously his hand flitted from throttle-lever to brake-valve, then back to throttle-lever, and moved neither the one nor the other.

Speeding breathlessly, he was passing through the deadly valley of decision; facing that sudden rising of the blind peril against which there is no real assurance of skill, he had decided.

He saw the big, brown buckle of freight-train, broken in two by its own "internal pressure," disrupted by its own quick-setting brakes, heaving, staggering, top-

pling perilously along the line of his own hurrying way.

He heard the pilot-beam of his engine strike and shear through a vagrant overhanging end of débris and toss it like chaff back upon the toppling menace on the inner track.

He sat, firm in his quick decision to do nothing, while his engine sped swiftly past the steadier rearward end of freight and felt the lurching grind of splintered wood ripping harmlessly along the glistening steel sides of the limited where only paints and jealously coddled varnishes were suffering by the rude impact.

Then she steadied and sped on while he caught the flash of the stock-still waycar of the freight safely passed to his rear with the clutter of wreck. Only then, he shoved the throttle-lever close home and set the air of his train as steadily as though the run were fully ended.

"All over, for this time, Sunny," he said, as the big engine ground steadily to its stop. "What can you see from your side? Hurry!"

Acre leaped from his crouching behind the boiler-head to a clear view rearward.

"Caboose and the back half all right, I guess," said Acre, clenching the window-ledge, in his concentrated stare. "She's a holy fright about the middle. Buckled out over both tracks for about ten cars' worth, is what it looks like.

"Say! Ten more ticks on the watch would 'a' fixed us for the big day, Jim. D'je know that? Just about ten more ticks, and we'd 'a' piled that up right. How'd you guess us through that, Jim?"

"Where's Sands? See anything of him?" queried Mahalie anxiously, as he wedged himself beside Acre at the window. "Say, Sunny, run back and ask him whether he's got anybody for the hospital, to come off the freight; or anything missing along the side of us, to hold us here. We can't stay here for nothing, you know. Hurry, will you? We can't both go."

He stretched higher in his effort for clearer sight across the line of curvature, and when his eyes settled back from that riven mass upon the curve, to fall upon Sunny Acre's sturdy figure running and shouting lustily to hurrying Sands, Mahalie allowed one sickening thrill of understanding, of what might have been, to shake him for an instant to the core.

That much of tribute he paid grudgingly to the thing which he had always feared to meet, and now had met. Then he came back solidly to the reassuring group that came running toward the engine.

He climbed down hastily to examine the minor damage to his pilot parts. There Hutton, Sands, and Acre gathered hurriedly around him with eager question and quick reply.

"Can you go, Jim, can you go?" demanded Sands.

"Yes. Ready?" rejoined Mahalie.

"Nothing here for us," said Sands. "But that's sure one of them back yonder. How ever did you miss it, Jim? You couldn't do that again in a million."

"Get aboard, you fellows," said Mahalie, as he finished his search for damaged air-fixtures, "for we've sure got to get out of this.

"How did I miss it?" he repeated over his shoulder while mounting the steps of the battered but unhurt gangway. "Well, I didn't, quite. But I figured that if I couldn't miss it altogether, the next best thing might be to hit hard and knock off all that hung over in the little time we were getting by.

"That's about all there is to my end of it, and I reckon one guess is about as good as another when you've got to go against the big, brown buckle.

"Hop on, Sunny, hop on. And that's the answer to your Villa Rica wrangle, you fellows; right back there on the track it lays. For me, it's that same old brown buckle for the big scare on this job.

"Why don't you give me a high-sign, Sands?"

"High-ball," said Sands briefly. "Take them away!"

Experience is a very competent despatcher. When you get your orders understand and remember.

Bea Berkeley's Butterfly.

BY HOLLY EDWARDS.

One Ancient Wheeze with a Semblance of Truth States that a Cat Has Nine Lives.

CHAPTER XVII.

The Incomplete Message.

AROUND him were all the evidences of a hasty departure. Closet doors stood half open, and the contents of bureaus and dressers were scattered about. Usually the epitome of neatness, Beatrice had evidently wasted no time in putting things to rights before starting on her errand of mercy to run into dangers of which he shuddered to think.

A hasty search of the open desk disclosed nothing, but on the table lay a torn telegram. Heyward seized upon it eagerly. The upper half was gone, but the remainder contained the information which he sought:

> Vernet, No. ——, Marquette Street. Hurry.
>
> FLAVIA.

Where was the rest of the message? He looked in the waste-paper basket, on the floor, under the couch, in every possible and impossible spot, but could find no trace of it; and, meanwhile, the precious moments were flying. It was no use; he must do with such information as he possessed. Hurriedly he closed and locked the door and, returning to the office, left the key with the clerk, with a word of thanks for the latter's courtesy.

An hour later he was rushing westward, cursing the slowness of the train with every revolution of the flying wheels. Never had the journey to the Windy City seemed so long. The night seemed interminable. Heyward tossed feverishly on his berth. Sleep was impossible. A thousand hideous fancies thronged his brain. Beatrice was in danger, and he, the man who professed to put her well-being above everything else, had gone a-pleasuring, leaving her no clue to his whereabouts should she have need of him. To be sure, Bartlett was with her; but even Bartlett would prove of little assistance in an encounter with the arch-villain Bult and the sharp wits of Flavia Graham.

At last, worn out and desperate, Heyward rose and made his way to the smoking-car. It was deserted at that hour, but a newspaper lying on one of the chairs attracted his attention. He picked it up and unfolded it as he lighted a cigarette and ran his eye over the columns. Then he stopped, appalled. His cigarette dropped to the floor as he read in glaring head-lines:

> SOCIETY WOMAN ELOPES WITH PHYSICIAN!
>
> The Beautiful Miss Berkeley and Dr. Bartlett Flee Together to Chicago.

The type blurred before Heyward's eyes; the paper sagged from his hand.

It had come! The scandal, the hateful publicity, the yellow-journal sensation! Beatrice had been seen on the train with Bartlett, and the fertile imagination of the reporter had done the rest. Her name would be blazoned in letters two inches high from coast to coast. She

Began in the June Railroad Man's Magazine. Single copies, prior to July, 10 cents.

would be ridiculed, laughed at, villified by millions of sensation-seekers and scandalmongers.

And it was all his fault, he reflected, with a burst of self-condemnation. Why had he not stayed at home to protect the girl he loved when she most needed his protection? Why had not something warned him that she would require his aid? In his misery and agony of mind, he cursed Flavia Graham, the cause of all the unhappy business; he cursed his friend and chum, Tom Bartlett, for allowing such a distorted version of the trip to be bruited abroad; he cursed himself for his selfish absorption in his own petty jealousy and troubles.

And the train sped toward its destination, while Heyward counted the minutes and miles that separated him from Chicago and the girl he loved.

The next morning a cab bore him at top speed from the station to the address given in Flavia's telegram. The number designated proved to be an unpretentious-looking house, the sign upon the door bearing simply the name "Dr. Vernet."

In answer to Heyward's ring, a woman in the uniform of a trained nurse opened the door. She showed Heyward into a pleasant little reception-room and departed in search of the doctor, returning shortly with the information that Dr. Vernet would see Mr. Haven—the name he had given—at once.

Dr. Vernet was smooth-shaven, short, and stout. He wore dark glasses. He talked in a throaty manner that was not altogether unpleasant, and opened the interview with an apology for the condition of his voice, due, he explained, to a disagreeable cold from which he was suffering.

In response to Heyward's eager questions, he stated that, four days previously, a gentleman giving the name of Bartlett had called in company with a lady who answered to the description given by Mr. Haven. Yes; Mrs. Graham had been there, but she had left the day before Mr. Bartlett arrived. No; the doctor regretted that he had no idea where she had gone. She had come there for complete rest and treatment for nervous breakdown, and had improved greatly under his treatment, he was glad to say. He had wished her to remain until a complete cure was effected, but she had been anxious to be gone, it seemed, and had departed as soon as possible.

Disheartened and discouraged, Heyward thanked the doctor for this meager information, and stood up to go.

"Mr. Haven! Mr. Haven! Ha, ha!" Heyward started, and the doctor smiled.

"Don't be alarmed, Mr. Haven," he said reassuringly. "It is only that very rude parrot of mine. He is very quick to pick things up, and probably heard you give your name to the maid at the door. See—"

He lifted a corner of the curtain which hid the swinging gilt cage, in which a green and red parrot nodded solemnly on a perch.

"Pretty poll!" Heyward said, moving closer to examine the bird. "A very fine specimen, doctor."

"Yes, and I am very proud of his accomplishments," replied the physician. "I am very sorry I can be of so little assistance to you in your quest, Mr. Haven," he added.

"Thank you for what you have been able to give me, doctor," answered Heyward. "Good-by, polly." He turned to go. There was a tug at his coat, a sound of rending cloth, and the mischievous parrot edged rapidly away from the bars of the cage, through which he had thrust his strong, hooked beak sufficiently far to grasp the edge of the pocket of Heyward's coat.

"That wretched bird!" exclaimed the doctor, ruefully examining the jagged little tear. "I am so sorry, Mr. Haven. I—"

"Oh, it's nothing!" Hayward interrupted him. "Nothing at all. The tailor can fix it in a few minutes. If you can give me a pin, I'll patch it up until I can get it repaired."

"Certainly!" said the doctor briskly. "I have one here," drawing it from under the lapel of his coat. "Permit me," and he fastened the torn edges together deftly. "It will hardly be noticed. Believe me, Mr. Haven, I am exceedingly distressed. Poll shall be punished for such vandalism. I had thought better of his manners."

"Oh, don't punish him," Heyward protested. "It really doesn't matter. But I have already taken up too much of your time. Thank you again, doctor."

He went down the steps and entered

the waiting cab, directing the driver to go to the New Auditorium. It was just possible, he told himself, that Beatrice might have been there; she always stopped there when she came to Chicago.

From behind his dark glasses Dr. Vernet watched the departure of the cab with an inscrutable smile.

The information which Heyward obtained at the hotel was as unsatisfactory as that with which Vernet had furnished him. Miss Berkeley had been registered there, but had left three days before. The clerk understood that it was her intention to return at once to New York; he had overheard her say something about getting back home. And that was all.

At the end of his resources, Heyward turned to the dining-room. He had eaten nothing since noon the day before; but, after ordering luncheon, he finally arose from the table, leaving the food almost untouched, paid his check, and left the hotel.

Four o'clock found him again in the train, speeding back over the same weary miles he had traveled such a short time before.

That night he slept the sleep of exhaustion. Outraged nature claimed her own, and for a few brief hours he found relief from the mental anguish which gripped him in his waking moments.

If Beatrice Berkeley had in truth returned to New York, she would be at her hotel, or she would have sent some word there. Thither he took his way as soon as he left the train at the Grand Central Station next morning.

As he sprang from the taxicab at the door of the Bismarck, his face lighted up. For there, ahead of him, just going into the ladies' entrance, was Beatrice herself! He quickened his steps in order to overtake her; but just as the boy opened the door for him, the click of the elevator-gate and a glimpse of the ascending car told him that he had missed it.

It was with a happy smile, however, that he turned to the friendly clerk at the desk.

"Will you ask Miss Berkeley if she will see me right away?" he asked eagerly.

For an instant the clerk regarded him blankly.

"Miss—I—er—she—I believe she is out, Mr. Heyward," he stammered, avoiding the young man's eyes.

"No, she isn't; I just saw her come in ahead of me," contradicted Heyward. "Ask her if I may come up at once, will you?"

"You did? Oh, very well, then. Mark"—he turned to the boy at the switchboard—"ask Mrs. Bartlett if she will see Mr. Heyward."

Mrs. Bartlett! The room seemed to whirl before Heyward's eyes; he put out an uncertain hand and clutched the edge of the desk.

"Mrs. Bartlett?" he faltered. "You—you are sure? There is no mistake?"

"No—there is no mistake, Mr. Heyward. Didn't you know?" The clerk's voice was very low; he looked down at the desk before him and then at Heyward, his eyes full of sympathy and pity.

"No," almost whispered the stricken man. "I—I had not heard."

"Mrs. Bartlett says will Mr. Heyward please come up right away," droned the voice of the boy at the switchboard.

To Heyward the nasal tones seemed to come from a long distance off. He regarded the operator in a dazed sort of way. Then he slowly took off his hat, drew out his handkerchief, and wiped the beads of cold perspiration from his forehead.

"Mrs. Bartlett says will you please come up right away, Mr. Heyward?" repeated the boy, half turning in his chair and looking over his shoulder.

And it was then that Jimmie Heyward showed the stuff of which he was made. He shoved the handkerchief back into his pocket, put on his hat, and turned to the clerk, who stood watching him with a half-frightened air.

"By Jove!" he said easily, "do you know, I forgot all about a man I've got to see! When I caught a glimpse of Mrs. Bartlett, the fellow just slipped completely out of my mind! He'll be waiting for me—and I'll get into trouble if I don't appear."

He turned to the boy at the switchboard.

"Explain to Mrs. Bartlett that I'll have to postpone coming up, will you?" he asked pleasantly. "And beg her to excuse me. Right," he added, "as the somewhat astonished youth transmitted the message through the telephone.

And turning on his heel, his shoulders square, his head erect, his hands thrust deep into the pockets of his coat, he passed out of the door and into the busy street, from which, it seemed to him, all sunshine and gladness had fled forever.

CHAPTER XVIII.

One and the Same.

"LOOK out, there!"

There was a confused medley of shouts and curses, a heavy hand on his arm, and Heyward awoke from his black reverie to find himself jerked rudely to one side, while a huge automobile sped swiftly over the very spot where he had been standing an instant before.

"Why don't you look where ye're goin'—philanderin' acrost Fifth Avenoo like it was a rose-garden?" The tall traffic policeman glowered indignantly as he stood by the curb, still clutching the arm of the man whom he had drawn from the path of death.

"I beg your pardon—I was thinking—I did not notice," stammered Heyward apologetically.

"No, I shouldn't think you did! Get along now, wherever ye're goin', and do your thinkin' somewheres besides the middle of the avenoo."

The policeman gave him a good-natured shove, and Heyward mechanically stepped upon the sidewalk, looking about him in half surprise.

He was standing at the intersection of his own street with the avenue. How had he come there? Surely, he could not have walked up from the Bismarck. Yet there was no other explanation for his presence; he had certainly not taken a cab or car. In his preoccupation, he must have directed his steps toward home.

With a shrug of his shoulders he turned westward, and half a moment later entered the Burrell, where his rooms were situated, touching the bell of his own apartment.

The door was opened by Wilkins, his man, who eyed the master with covert disfavor.

"Mr. Heyward, sir?"

"Yes, Wilkins," wearily. "I'm back."

"Yes, sir; so I see, sir. I waited for you to come aboard the Mermaid, sir; and when you didn't return at the time you said, I come 'ere, thinkin' you might need me, sir.

"Beg pardon, Mr. Heyward, sir, but what *'ave* you been a doin'? Your coat is torn, and your hand is all bloody, sir!"

"Is it?" Heyward looked down indifferently. "So it is, Wilkins. Oh, I remember now," he added, as his eyes fell upon the jagged scratch that adorned the back of his left hand, extending from the base of the index finger nearly to the wrist. "I tore my coat and pinned it together, and must have torn my hand on the pin."

"Beggin' your pardon, Mr. Heyward, sir, it must have been an uncommon large pin to tear right through your glove that way." Wilkins was solicitously examining the injury as he spoke.

"My glove? Why—I—I guess I must have neglected to put my glove on, Wilkins."

The man turned a look of dismayed horror on his master, but Heyward did not notice it. He slipped out of his coat, and turned it over in his hand, removing, as he did so, the pin which held the torn flap of the pocket in place.

"Yes," he continued, "out in Chicago!"

The cry burst from him involuntarily. For in his palm lay—*a mounting-pin, the exact duplicate of the one he had seen impaling the butterfly in the morgue!*

He stared at it for a moment in stupefaction. Vernet and his sanatorium—the dark glasses—the cold the doctor had deprecated—Flavia Graham's telegram—all the incidents leading up to and following his trip to Chicago flashed across his brain with crystal clearness.

Vernet was Bult!

He sank into a chair.

"Fool! Fool!" he groaned, half aloud. "Not to have suspected—not to have known! Oh, fool!"

Wilkins stood at his side, divided between astonishment and dignified disgust. Mr. Heyward had not been himself of late—but to-day—this extraordinary conduct—was he—was he *intoxicated?*

"Mr. Heyward, sir?" he ventured timidly. But Heyward did not even hear him, and he retreated to the other side of the room, watching his master closely.

Yes; there could be no shadow of doubt. Vernet was Bult! And Beatrice

—we—Beatrice need have no fear; she was safe in New York—and married to Tom Bartlett. Beatrice was married to Bartlett!

And he, Jimmie Heyward, had been betrayed by his friend—made a mock and a laughing-stock by the woman on whose sincerity, on whose integrity, he would have staked everything he possessed! The thought was maddening. Yet—it was too late.

But what of Flavia? Where was she? Undoubtedly still in Chicago, from where she had sent those telegrams. In Chicago? *Was she again in the power of Bult?* It was more than possible—it was almost certain!

Perhaps she had known nothing of the telegrams that had called Beatrice to Chicago—or perhaps Bult had forced her to send them. But what more simple than that he should himself sign her name to the message?

Vernet had said that she was no longer there—but had he told the truth? Had he not lied? Was she not still there, in that house, where he could, undisturbed, wreak his revenge upon her? Heyward shuddered as he thought of the threats Bult had made—of the look of malignant hatred in his fierce black eyes.

Whatever Flavia's faults, whatever crimes she might have committed, with all her soul she hated and feared this man, this lying, cheating impostor! She had sent for Beatrice—Beatrice had had the whole of the telegram; she must have known that some danger threatened her cousin. And yet—she had allowed Bult to deceive her, too!

Bartlett had allowed Bult to deceive him, even as he, Heyward, had been hoodwinked. But Bartlett, too, had known the whole of the telegram; he should never have permitted Bult to impose upon him.

But both Beatrice and Bartlett, engrossed in their own plans, wrapped up in each other, had been only too ready to believe that Flavia was safe, that they might return home! And this they had done, leaving a helpless woman in the power of this fiend!

All the natural chivalry of Jimmie Heyward's nature rose in revolt at such criminal carelessness! Oh, if he had only known when he was there with Vernet!

"Wilkins!" he called. "I must go to Chicago at once! Put a couple of changes into my grip—and then get me a bite to eat. I'm off on the flier again this afternoon!"

"What," he whispered to himself as from the train window he watched the panorama of the landscape—"what if I should be too late?"

"Too late!" sang the swiftly revolving wheels.

"Too late!" screamed the exhaust of the engine.

The daylight faded; the train seemed to be rushing directly into the glory of crimson and gold in the west. Still Heyward sat, staring out with unseeing eyes. The sunset miracle faded; one by one, the stars peeped out.

"Do you wish your berth made up, sir?" It was the voice of the porter.

Heyward started and looked at his watch. It was eleven o'clock! For a moment he hesitated. Then he shook his head. Of what use to go to bed? He could not sleep.

"No," he answered, "not yet. I'll ring for you when I'm ready." He sank back in his section, and turned to the window again.

How black the night was! The telegraph-poles seemed flying by in a long, seemingly endless procession. The stars looked cold and far away.

Spectral forms hovered over him in the darkness; horrid faces leered at him. An icy hand touched his. In his ear a hollow voice shrieked out: "Too late!"

A pool of black water yawned before him; on the brink Flavia Graham struggled in the embrace of a ghastly skeleton. He heard her pitiful cry for mercy—saw a gleam of iridescent light! It was the emerald butterfly, upraised over her shrinking form!

And the face of the grinning horror that held the weapon was that of Bult! Heyward tried to move, to rush to the woman's rescue; but he seemed held down by bands of iron.

The upraised arm was descending; he heard Flavia's last despairing shriek—saw her close her eyes and fall back—

With a violent effort he sat up, blinking his eyes. A flood of sunlight enveloped him; about him was the noise and bustle of departure. The train had come to a standstill in the Chicago terminal—and he had sat up all night!

Exhausted, rather than refreshed by his haunted slumbers, he dragged his weary limbs from the seat, and, gathering together his belongings, stumbled down the aisle and out of the car to the platform. Walking slowly out to the cab-stands, he tried to collect his scattered thoughts.

Suddenly he was galvanized into new life. Was it—could it be—was his overwrought brain tricking him? For there, just entering a cab, was Beatrice herself! And he had left her in New York! It was impossible, inconceivable, that she should be here.

He sprang forward; but in the moment of indecision the cab-door had shut with a bang, the vehicle swung about, and rattled down the street at a good pace, to be lost in the maze of traffic.

It took Heyward a full minute to realize what had happened. How had Beatrice come to be in Chicago? Where was Bartlett? Was it possible that he had made a mistake yesterday—that it was not Beatrice he had seen? Was it possible that the clerk of the Bismarck had mixed things up—that Beatrice was not married to Bartlett, after all—"

He wheeled and dashed through the waiting-room to the telephone-booths.

"Get me the Bismarck Hotel, New York," he directed the operator excitedly. "I want to talk to Mrs. Bartlett—no one else. Rush it, please." He fidgeted around uneasily while the connection was being made.

"Number four booth for New York," announced the operator, after what seemed a wait of hours. "Mrs. Bartlett—are you there?—Here's your party, sir.—Go ahead!"

"Hello!" Heyward said in a voice that he vainly tried to hold steady.

"Hello!" came clearly back. The tones were unmistakably those of Beatrice Berkeley—no, Beatrice Bartlett!

"Hello—this is Heyward, Jimmie Heyward!" he called into the transmitter. "I'm in Chicago. Are you in New York?" It sounded banal, foolish; but this was no time for conversational brilliancy.

"Why, surely!" he heard the well-known voice say. "Aren't you talking to me here? What are you doing in Chicago? We—Tom and I—were so surprised and disappointed yesterday when you wouldn't come up. Why didn't you? You know— Did you know that I had married Tom Bartlett? Hello!—hello!—why don't you answer? Hello!—Chicago!—Central, did you cut off? Hello!—hello—" The click of the receiver as Heyward snapped it upon the hook was the only reply that the wires carried to New York.

CHAPTER XIX.

"Your Game Is Up!"

HEYWARD paid the toll mechanically, and walked slowly out. He had no definite plan of action. The bottom seemed somehow to have fallen out of things. Suddenly the thought of Flavia flashed across his brain; he hailed a cab, and directed the driver to go to the address on Marquette Street. Black rage was seething within him. It had been almost impossible for his overtired brain to comprehend the action of Beatrice in marrying Bartlett; impossible to imagine Bartlett as a party to such a breach of faith with his chum as that involved in this monstrous farce. While he—Heyward—had been toiling like a galley-slave in her cause, Beatrice Berkeley had been listening to the words of love of Tom Bartlett; had been repeating the vows that separated her forever from the man whose one thought was for her. Perhaps they had even laughed at him—laughed at the devotion that he offered to the girl who had scorned it and flung it aside like a broken fan. And Bartlett—he had been ready to send Beatrice to prison and disgrace on the strength of weak circumstantial evidence; and now—he had promised to love her forever; would he keep that promise? Heyward thrust his head out of the window and shouted at the cabman.

"Drive faster!" By way of answer, the driver whipped up the rack of bones by courtesy called a horse. The cab swung into Marquette Street.

"Here ye are!" called the jehu, peering down from his perch, as he pulled the cab up with a jerk in front of Dr. Vernet's house.

Directing the man to wait, Heyward climbed the steps and rang the bell. The door was opened by the same nurse who had admitted him on the occasion of his

previous visit. The doctor was in, she thought; she would call him if Mr. Haven would step in. She ushered Heyward into the little reception-room, and a moment later the doctor entered.

"Mr. Haven? Ah, yes; I remember. You were here a few days ago. How can I serve you this morning?"

"By telling me what you have done with Flavia Graham," Heyward answered crisply, rising to his feet and confronting the smaller man.

"My dear sir, I told you the other day that I know nothing of Mrs. Graham or her present whereabouts," he said. "She—"

"Cut all that out!" commanded Heyward savagely. "I know you, Dr. Vernet-Bult-Kalb! Your game is about up. You've had your innings, and now it's my turn at the bat."

The doctor shrugged his shoulders. "Are you crazy, and have you come for treatment?" he asked solicitously. "Or are you just an ordinary crank? I do not quite understand."

"Don't you?" Heyward asked with rising anger. "Well, it won't take me long to explain. I know that Mrs. Graham was here, and I know that you know where she is now. I'll give you just two minutes to tell me." He drew out his watch

"I do not recall denying that Mrs. Graham was here," replied Vernet; "but I do deny that I know where she is now. And I also deny your right to question me in this manner. You are insolent, sir, and I shall have you removed from the house."

"I shouldn't advise you to try it," Heyward remarked coolly, "unless you wish to land in jail. I told you the game was played out. If you wish me to make it any clearer, I don't mind telling you that the instant you put your foot out of the door you will be taken into custody and jailed!"

"Arrested? For what? I have committed no crime! Again I demand that you leave this house at once!"

"Very well, I'll go," Heyward said, turning as if to leave. "But let me tell you just this—Mrs. Van der Poel, one of your victims in the beauty-parlor swindle you worked so successfully in New York, has at last consented, out of regard for Miss Berkeley, upon whom all the onus of the scandal rested, to swear out a warrant for your arrest on the charge of obtaining money under false pretenses. There is a policeman waiting for you now, outside."

The doctor paled a little. "I do not believe it," he said; "and even if it were so, this is not New York. A New York warrant would have no jurisdiction here."

"You don't suppose I was fool enough to think it had, do you?" demanded Heyward. "Extradition papers have been granted, and your liberty isn't worth a brass nickel. There's just one way you can save yourself from going to jail," he continued, pausing an instant to let Vernet—or Kalb—get the full effect of the threat. And that is to give me full and definite information as to the present whereabouts of Flavia Graham. Refuse and, well, you'll see the inside of a cell within an hour."

"I tell you I don't know!" declared the doctor, nervously pacing up and down. "This is terrible. I assure you, Heyward, Mrs. Graham left here several days ago, in company with your friend Bartlett and her cousin, Miss Berkeley. Since then I have seen or heard nothing of her. I haven't an idea where she is."

"I believe you're lying!" Heyward informed him. "It isn't in you to tell the truth. Very well, if you won't tell, you won't. I'll see to it that you're in jail before dark. We'll see if that will open your mouth."

"You can't send me to jail on any such trumped-up charge," reiterated the other. "There's no question of obtaining money under false pretenses. The treatment was all right, just as I guaranteed it to be, but my patients decamped without waiting for the end of the course, and surely I cannot be held responsible for the results which naturally attended their leaving my care."

"Of course, they were expected to remain in a deserted house without food or attendance," sneered Heyward.

"Not at all," the doctor hastened to inform him. "Unfortunately, all my help went on strike. Mrs. Graham and I went out at once to see if we could secure others. During our absence you appeared, told the patients some cock-and-a-bull story, and when I returned the house was empty. The birds had flown. I discovered what a stir the affair

had caused; and, knowing the futility of explanations where women are concerned, I decided to wait until the thing had blown over, and then seek some redress from the calumnies which had been heaped upon me. And now you come with this fresh outrage!"

Heyward laughed outright. "Pretty good, at that!" he commended. "But you should have an example of your wonderful cure to show to the skeptical, like myself."

"What more do you desire than Mrs. Graham, Miss Berkeley—"

"Yes, and Mrs. Van der Poel and Miss Schuyler!" scoffed Heyward. "Once more, where is Mrs. Graham?"

"To the best of my knowledge and belief, she is somewhere in Chicago," replied the doctor, sitting down in an easy chair and looking at Heyward with a tolerant air, as if he were some one badly afflicted, but whom it would be well to humor. "Suppose you go and find her?"

Across Heyward's memory flashed the face he had that morning seen in the window of the cab at the station. Why, of course—how stupid he had been not to suspect it before—that was Flavia herself!

He turned to the waiting doctor.

"Look here, Bult," he said, "I understand that is your name—I don't for a moment believe all you have said, but I'm going to give you a trial. I'll go out and see if I can locate Mrs. Graham. I'm afraid it will be a good deal like looking for the proverbial needle in a haystack, but I'll try it, anyhow.

"In case I don't come across her by this time to-morrow, I'll come back here and have a heart to heart talk with you. In the mean time don't try to slip away, because the house is watched, and if you get into the clutches of the law it's back to New York for yours. Think well before you decide to go out walking."

He picked up his hat and turned to the door, but the doctor stopped him.

"One moment, Mr. Heyward; I think, before you go, that it would be better for you to understand me a little more clearly." There was an earnest tone in the man's voice which compelled Heyward's attention.

"In the first place, you seem to have the impression that I have injured Flavia Graham. I have done nothing of the sort. On the contrary, I have performed a great service for her, the value of which you will appreciate when you see her. As for Miss Berkeley—"

"One moment," interrupted Heyward. "If I have any such impression, you yourself are responsible for it. I recall quite clearly what you said the night you were at my rooms—the threats you made against both Mrs. Graham and Miss Berkeley. I have no reason to suppose that your feelings toward either of those ladies have changed materially since that time."

The doctor shrugged his shoulders.

"Quite so," he assented. "But you have made no allowance for the excited state in which I was at that time. A valuable—I may say priceless—discovery had been stolen from me. I was naturally angry—what man in my place would not have been? I knew that Flavia Graham had the packet which meant untold wealth, fame, and success to me.

"What would you have done in my place? Taken it from her, of course—and that is just what I did! No matter what the method I used—that has nothing to do with the case. The fact remains that, once my precious packet was again in my possession, my thirst for revenge vanished.

"I have a somewhat ungovernable temper, Mr. Heyward; when wrought up to such a pitch of rage as I was that night, I am hardly responsible for what I may say or do. I am used to being obeyed, and Flavia Graham always disobeyed me—when she dared.

"However, that is all past and gone I am quite through with my sister-in-law, as I presume she is through with me. By her somewhat unwilling assistance, I have been enabled to prove the value of my discovery. I have established this place here, and here I propose to remain—unless you take steps to force me to leave.

"As for Miss Berkeley—she has something which rightly belongs to me. I shall one day secure it—if I can. But, in the meantime, she, as well as all the rest of you, are quite safe from me."

Heyward laughed.

"If not, we soon will be—if you go out before this time to-morrow," he observed. "And now I'm going. I don't

believe the half of what you've just told me—but it really doesn't matter. If I find that Mrs. Graham is safe, and is willing to let the matter drop, I shall be only too glad to wash my hands of you and all your works.

"But"—and his voice grew hard—"if I am unable to find her, or if I learn that you have in any way injured her, it will go hard with you. Miss Berkeley has some one who can look out for her welfare—and I propose to make myself responsible for that of Mrs. Graham."

He turned to the front door and opened it. On the steps he paused.

"Remember!" he warned, and walked down to the cab.

He was beginning to feel very tired indeed. Days of racking mental torture, nights that were sleepless, or worse than sleepless, rendered imperative of complete rest.

At the present time it was impossible for him to dismiss all perplexities from his mind; but he decided that he would go to the New Auditorium and strive to get at least a few hours' sleep before taking up his search for the missing Flavia.

As the cab rattled off down the street the doctor turned away from the window, shaking his head.

"It's a good thing I figured out he wasn't as easy to handle as he looks," he reflected. "I was wise to get those two women off my hands. I wonder just how much truth there was in that story about extradition papers? I hardly think those New York women would really consent to appear against me—but perhaps it will be just as well to take no chances."

CHAPTER XX.

"Jimmie, Don't You Know Me?"

AT the door of the hotel, Heyward paid the exorbitant charge of the cabman without a murmur. He was far too tired to stand and haggle over the price.

Engaging his room, he was about to enter the elevator, when he collided somewhat forcibly with a woman who was just stepping out.

"I beg your pardon," he said, mechanically lifting his hat. "I hope I didn't hurt you."

"Why, Jimmie Heyward! What are you doing here?" cried the object of his solicitation, extending a daintily gloved hand.

"Laura Bryce!" exclaimed Heyward, grasping it firmly and shaking it with warmth. "This *is* a surprise! I might ask the same of you. Why so far from Milwaukee town?"

"Just taking a flying trip to New York with Fred—Mr. Bryce—and a young friend of mine whom I am chaperoning. She has been staying for a few days with me, and—but you're looking wretchedly, Jimmie. What *have* you been doing to yourself?"

"I'm just tired," Heyward said. "I've been chasing around a good bit, and I suppose I do look rather done up."

"You certainly do," Mrs. Bryce declared with conviction. "But we're keeping the elevator waiting. Come along up to my rooms and sit down for a few minutes. I want to talk to you."

"Oh, I say, Laura, you'll have to excuse me," he protested. "I'm 'all in, down and out.' I'll see you in the morning."

"Indeed, I'll do nothing of the kind," Mrs. Bryce answered calmly. "You're going up now. We're leaving early in the morning. Besides, there's some one up there who will be glad to see you. Come along."

"But—"

"Come along! I'll not take no for an answer."

"Who is it?" he inquired wearily, submitting perforce to the demands of the impetuous young woman. "I'm not in company trim, you know."

"You'll find out soon enough," Mrs. Bryce answered mysteriously. "There's a tiresome man waiting for me, but I'll get rid of him as soon as I can and hurry right back."

She led the way out of the car and opened the front door of her apartment. "Are you there, dearie?" she called, raising her voice. "Here's some one to see you. The front room, Jimmie."

She gave Heyward's arm a friendly little pat and pushed him toward a door on the right.

"Go in it, Jimmie—don't be afraid," she said, and with a smile was gone.

Heyward went slowly into the room indicated. He wondered idly who it was

that Laura Bryce wanted him to see. Well, it didn't much matter, only he wished heartily that he had been a minute before or a minute later, and then he could have gone straight to his room and gotten some of the sleep for which he craved. How good it would be to sleep soundly once more!

The door behind him opened and some one entered; his ear caught a little silken rustle, and he turned about just as the newcomer touched the electric button and flooded the room with light.

"Flavia Graham!" he gasped.

But what a Flavia! Vernet had told the truth—for the face of the woman before him was as delicately colored as a rose-petal, and without suggestion of line or wrinkle.

She was in evening dress, and the soft wistaria folds fell about her in graceful, clinging lines, leaving her neck and arms bare. Around her throat a band of wistaria velvet was held in place by *the emerald butterfly!*

She gave a little rippling laugh.

"Why, Jimmie, don't you know me?"

"Of course," he answered, his eyes still fixed on her face. "You're Flavia Graham."

"Not Flavia Graham, Jimmie; Beatrice Berkeley."

But Heyward knew better.

"Oh no!" he laughed. "You see, I saw Beatrice in New York yesterday. 'The beautiful Miss Berkeley' was—I beg her pardon, I should have said Mrs. Bartlett." The laughter died from his lips."

"I assure you, Jimmie, you've been 'seeing things,' as Laura would say," protested the young woman. "The person you saw was Flavia—"

"She was not!" retorted Heyward hotly. "I guess I know Beatrice when I see her. Besides, I talked to her in New York over the long-distance telephone this morning, and she—"

"Did she *say* she was Beatrice?"

"No; she said she was Mrs. Bartlett," grimly. "But I—pshaw! Do you suppose I don't know her that I could possibly mistake her for any one else?"

"Mrs. Van der Poel thought she knew, too," said the girl softly. "Jimmie, boy, you need convincing, too. Look—is the butterfly under the velvet—or not?"

She slipped the band up a trifle and lifted the emerald butterfly, which lay, a splash of living fire, on her white throat.

Heyward bent forward with dry lips. His breath caught sharply, and his eyes half closed.

For the little butterfly mark—*was there!*

"Beatrice!" he cried, catching at her hand. "Beatrice—is it you? Then who—*who* is the wife of Dr. Bartlett?"

"Flavia, to be sure; I—why, Jimmie, take care!" She sprang forward and caught his arm.

"I'm all right." He smiled faintly. "It was the heat—I'm tired out—the shock of seeing you—" He sank weakly into a chair.

"Let me get you some wine," Miss Berkeley said. "That will make you—"

"No—I don't want any wine. Just sit down there and let me look at you—let me be sure that I am not dreaming again, and that I am not going to wake up and find that you are only a vision," he said softly.

"But, Jimmie, how could you imagine that I had married Tom Bartlett?" she asked reproachfully, slipping into a big Morris chair opposite Heyward.

"I don't know, Beatrice. The papers all said you—you had—"

"Eloped!" she finished scornfully. "And you believed every word of that nonsense?"

"No; but then I saw you—saw Flavia at the Bismarck, and asked for you, and the clerk said 'Mrs. Bartlett' and—"

"I see!" she laughed. "He probably mistook Flavia for me. It was quite natural. She is very like me now, since Kalb—or Vernet—restored her complexion. I verily believe it was the only decent thing the old villain ever did, and his motive was probably entirely contrary to the result thereof."

"Her complexion—Kalb—I'm all at sea, Beatrice. You'll have to play pilot, if you don't mind."

"It's a long story, Jimmie—"

"Never mind; I want to hear it—all. How you came to Chicago, and what happened here—everything about it. How Flavia came to marry Bartlett—the whole menu, from oysters to *café noir*."

"But, Jimmie, you're tired—"

"I'm not," he interrupted. "I was, but I forgot all about that long ago."

Heyward looked ten years younger than the broken, world-weary man who had entered the room half an hour before.

CHAPTER XXI.

The Door Closes.

"WELL," Beatrice began, leaning back and clasping her hands behind her head, "I got a telegram from Flavia Tuesday of last week, in which she said: 'In power of Kalb. Prisoner. Goes under name of Vernet, No. — Marquette Street, Chicago. Hurry. Flavia.'

"Of course, I thought first of you, but no one knew where you had gone, and I couldn't find you. Then I telephoned to Dr. Bartlett, and learned that he, too, had received a message, and was about to send me word before leaving on his mission of rescue. I called up Miss Allbright, but she had a contagious case, and could not come.

"I dared tell no one else, so I started alone, with Dr. Bartlett to look after me. We went at once to the address Flavia had mentioned in her message, and saw the doctor. It was Kalb beyond a doubt, yet very cleverly disguised. Any one who did not know him as well as I did might readily have been deceived.

"He said Flavia had gone away. Dr. Bartlett told him he lied, and accused him of being Kalb. Of course, he denied it, but he was plainly a little disconcerted. Then we heard a muffled scream: it was Flavia's voice.

"Dr. Bartlett waited for no more; almost before I knew what he was about, he had knocked the doctor down, and had tied his hands and feet with cords that he cut from the shades. Then he rushed up-stairs, with me at his heels. He shouted, and Flavia called back. We found the room where she was imprisoned. The door was locked, but Dr. Bartlett burst it in. We found her alone.

"The poor girl's elbows were fastened at her sides so that, although she could use her hands, she could not raise her arms to her head.

"Her face was covered with one of those hideous masks; and when Dr. Bartlett cut the cords that bound her arms, the first thing she did was to tear it off.

"Jimmie, it was startling; for a moment I thought I was looking at my own face in the mirror. Then she began to cry, and begged that we take her away at once from that awful place.

"While we were waiting for a cab," Miss Berkeley continued, "Flavia told us how she had come to Chicago, that she had been given chloroform while asleep in the train, and brought to the place where we found her.

"Kalb told her that he was going to cure her wrinkles, and tied her in a chair. Then he put a lot of things on her face, and she said the pain was terrible; but, although she screamed, no one heard, or, if they did, paid no attention.

"For two weeks he kept her there. Every day he would come in and make remarks about the 'poetic justice' of his curing her complexion for her after he had made it what it was when you saw her. I forgot to tell you that—Jimmie, that fiend was responsible for all her wrinkles and yellow color.

"He put some chemicals on her skin while she was staying with her sister, his wife, just out of revenge for something she did which he had told her not to do. He kept her there for two weeks. She tried to bribe the nurse, but the woman only laughed at her.

"Then one day she managed to find the stub of a pencil, and wrote three messages—one to you, one to Dr. Bartlett, and one to me. She threw two of them out of the window, with a piece of money wrapped in the paper, and an appeal to the finder to send it at once.

"Just as she was going to throw out the one to you, the doctor came in and caught her. He took the pencil and paper away from her, tied her in the chair again, and kept her without food for two whole days.

"He released her only the morning we came. From her window she saw us as we came up the street, and screamed to let us know where to find her.

"Well, then, Dr. Bartlett said the only way to take care of her properly was for him to marry her. He said that he had been sure that he loved her from the night she came to your rooms to ask you to help her escape west, and that a marriage with him would give him the right to look after her. She consented after a while, and we all went direct to Laura Bryce, in Milwaukee, and they were married there." She paused.

"I wish I'd been there," Heyward murmured. "There would have been a double wedding—with your permission," he added as an afterthought. Beatrice flushed rosily.

"I mean it," Heyward said earnestly. "I sha'n't be happy until you're safely married to me, dear. You know how I care for you—have known it this good while. I've come too near losing you several times lately to want to risk it again. I tasted the bitterness of hell these last few days, when I thought you were married to Tom. Beatrice, dear—will you—do you think you could love me just a little? Do you suppose that you could learn to care for me enough?"

The flush on her cheeks deepened.

"I've cared enough for a long time, Jimmie," she said softly. "But before I give you any definite promise, all this talk about Dr. Bartlett and me must be stopped. I can't—"

"What do we care what people are saying?" he demanded. "Flavia is married to Tom—no one will know that you were really the one who went to Chicago on that train. They will think it was Flavia, and all the newspapers will be falling over themselves making apologies."

"Dr. Bartlett has returned to Mrs. Van der Poel, Miss Schuyler, and the rest all the money they paid to Kalb—or whatever his real name is," said Beatrice reflectively. "The jacket was finally recovered from the river—and he says he is going to tell Mrs. Van der Poel the whole story. I believe everything will be right for him and Flavia."

"He wouldn't care whether society turned him out or not—so long as he has the woman he loves," said Heyward. "But that has nothing to do with us. Mrs. Bryce is going to chaperon you to New York right away, and then—" He rose and went to her side.

There was a knock at the door. Neither heard it. Another. Still they remained oblivious. Then the door opened softly, and Laura Bryce appeared on the threshold.

For an instant she stood there; then, with a quiet smile, she stole out again, gently closing the door behind her.

(The end.)

OPERATING COST OF PENNSY ELECTRIC ENGINES.

GEORGE GIBBS, electrical engineer of the Pennsylvania Railroad, recently gave some data concerning the first year's electrical operation of the Pennsylvania at the New York terminal. The main line from Harrison, New Jersey, to the terminal station is about nine miles long. Of this six and one-half miles are on the level, and the rest of the line through the tunnels and its approaches has some very heavy grades. The service is largely handled by electric locomotives. The tunnel is much drier than was anticipated, and there is therefore a better factor of adhesion.

The locomotives made a total of 909,000 miles during the year, of which 650,000 miles was road service, while the remainder was for switching and transfer. The locomotives averaged 26,000 miles for the year, and the service was entirely satisfactory. The cost of repairs per mile run was 5.91 cents. This is greater than was expected and was largely due to the cost of maintenance of the brake shoes, to tire turning, and to a number of structural changes which it was necessary to make after the locomotives were placed in service. On the New Jersey division the cost of repairs to steam locomotives was 8.83 cents per mile, while for the Pennsylvania as a whole the cost was 11.91 cents per mile. The lubrication of electrical locomotives cost .25 cents per mile, or about the same as for the steam locomotives. The engine-house expense for the electric locomotives amounted to .58 cents per mile, while for steam locomotives on the Pennsylvania it amounted to 2.58 cents per mile.

The important savings were, therefore, in the repairs and the engine-house expenses. The electric locomotives are given a daily inspection, and after every 2,500 miles run are given a detail inspection, which requires about four hours' time. When the electrical operation was first started the locomotives were given a detail inspection after every 800 miles, but this has been gradually increased to 2,500, as the reliability of these locomotives has become more evident. There were only 16 failures of electric locomotives during the year, and for the multiple unit trains, which made about 300,000 miles, there were only three detentions.

AT THE TICKET WINDOW.

WHAT is the most foolish question you ever heard, Mr. Station Agent? Now, don't all answer and say it was, "What time does the three o'clock train leave?" There are many that are just as foolish, and if you ever heard one that can beat those published below, give it a clearance and send it to the magazine:

IMAGINE the look that came into the face of J. P. Duck, Jr., the agent at Carrsville, Virginia, when a woman appeared at the ticket-window and blithely asked, "May I take a sleeper without going to sleep?"

Think of the problem that D. G. Williams, of St Petersburg, Florida, had to solve when an old lady who was about to take her first railroad journey asked, "When will the railroad have its next accident?"

Marvel at the domestic secret that was entrusted to William G. Yates, of Albion, New York, when he was summoned to the telephone and a sweet voice said, "Mister, when my husband calls for a ticket, tell him that the baby is asleep!"

And just picture that gratified feeling of the B. and O. agent at Lester, Ohio, when he received the following postal: "I left a large black pocketbook at the depot Tuesday. It had two eggs and some fancy-work and a piece of cheese. You can keep the cheese if you have found the pocketbook. I will call for it."

THIS bunch was actually heard at Burrows, Indiana: "Has the last car that went gone yet?" "Will you please flag the limited? I'm looking for a friend on it." "Does the air-brake give plenty of fresh air?"

WHEN J. C. Nale, now of Hoitville, California, was at Bolivar, Missouri, two young men came to the window and asked the fare to Kansas City. "Four dollars and twenty cents," replied Mr. Nale. "Well," said one of the young men, "if we take two, won't we get them at reduced rates?"

THIS conversation took place at Sawyer, Michigan, recently:

Q.—Has the train gone yet?
A.—Yes, ma'am.
Q.—What time does it go?
A.—6.54 P.M.
Q.—Will it be on time to-morrow night?

J. P. KENNEDY remembers the following in his ten years at Estancia, New Mexico:

"Will there be any snow-storms next week which will make the roads tie up their trains?"

"My wife's sister and brother were figuring on leaving Jack County yesterday. Will they be on to-morrow's train if it is on time? I would like to know, so as to save a sixteen-mile drive."

"If I buy a round-trip ticket do I have to come back to this town?"

"If I buy an accident ticket and don't use it, will you give me my money back?"

NOT long ago a daintily dressed young lady whose profusion of blushes indicated that she was a bride, gingerly approached the operator at a southern Indiana station and handed in this telegram, while Mr. Newlywed stood in the background:

"Dear Parents, Winona, Minnesota. We were married to-day.—Mae"

She slapped down half a dollar for the message and vanished with friend husband before the operator could learn where her parents lived.

S. K. ELDER, San Benito, Texas, was once asked: "If a message were to come in, and you were not here to receive it, would it burn the office up."

TEN miles west of Monroe, Wisconsin, the branch of the Illinois Central Railway, running from Freeport, Illinois, to Dodgeville, Wisconsin, crosses the line of the Chicago, Milwaukee and St. Paul Railway, running from Janesville, Wisconsin, to Mineral Point, Wisconsin, at a small and lonesome station named Dill.

The Railroad Commission of Wisconsin recently passed a ruling compelling the evening passenger trains on the two roads, due at Dill at the same time in the evening, to wait thirty minutes for connections, provided either train was late.

A few days ago a young lady appeared at the ticket-window. As the agent was out at the time, the operator asked her what he could do for her, and this was their conversation:

She.—Will the trains make connections at Dill to night?

Opr.—Yes, ma'am, if they are not over thirty minutes late.

She.—Oh! But don't they always wait?

Opr.—No. You see, when the Illinois Central train is late, our train has to wait thirty minutes for them; and when our train is late the Illinois Central train has to wait thirty minutes for us.

She.—Well, if both trains are on time do they wait?

THESE were gathered in at several stations in Wisconsin:

Timid Old Lady.—Mr. Agent, I want to go pretty close to Montreal.

Agent.—How close?

Timid Old Lady.—About three hundred miles to the south.

Stranger.—What time does the next train go east?

Agent.—Ten o'clock.

Stranger.—Is that the next train east?

Time, 11.35. Question.—When does the next train go west?

A.—11.41.

Q.—Isn't there anything before that?

WHEN LOVE IS ENGINEER.

BY LYDIA M. DUNHAM O'NEIL.

Written for the "Railroad Man's Magazine."

SWEETHEART, Love is at the throttle,
And the long track leads away—
Leads into the distant future,
Where the years are mile-stones gray.
Many a sharp curve lies before us,
Many a tunnel, long and drear,
But we'll make the journey safely,
For Love is our engineer.

All around are storms and dangers,
True hearts stricken, fond hopes slain,
But the love lights bright are shining
On our matrimonial train.
Safer than the gripping coupler
Is our wedding-ring, my dear,
For our hearts in tune are clicking,
And Love is our engineer.

Watch the landscape, whirling, flashing,
In a dizzy circle spin;
'Tis the gaudy world of pleasure,
Beckoning to us within.
Draw the curtain, lest it blind us
To the deeper pleasures near,
Lest old Envy steal upon us,
And we lose our engineer.

For the way is long before us—
There are mountains we must climb;
Streams to cross and caution signals,
But we'll make the run on time.
For the wheels are clicking sharply,
And the signal's showing clear,
Both our hearts are true and faithful—
And Love is our engineer.

GUARDING UNCLE SAM'S PRIVATE TRAIN.

BY FRANKLIN FISHER.

EVERY little while there appears in the newspapers a short announcement that the President is about to start on a long trip through the country. Sometimes it is to attend the opening of an exposition or celebration, the launching of a battle-ship, the unveiling of a national monument or a long speechmaking tour.

These announcements are always read with interest by millions of newspaper readers, but by reason of their frequency few people realize what a long and arduous task it is to make the preparations for the trips of a chief executive, the great attention to detail, which is necessary to reduce the chances of accidents to a minimum, and the scope of the arrangements.

Time was when but little attention and care were given to the preparation of a Presidential journey. Since the assassination of President McKinley, the secret service and the President's personal staff have realized to a greater degree their responsibility.

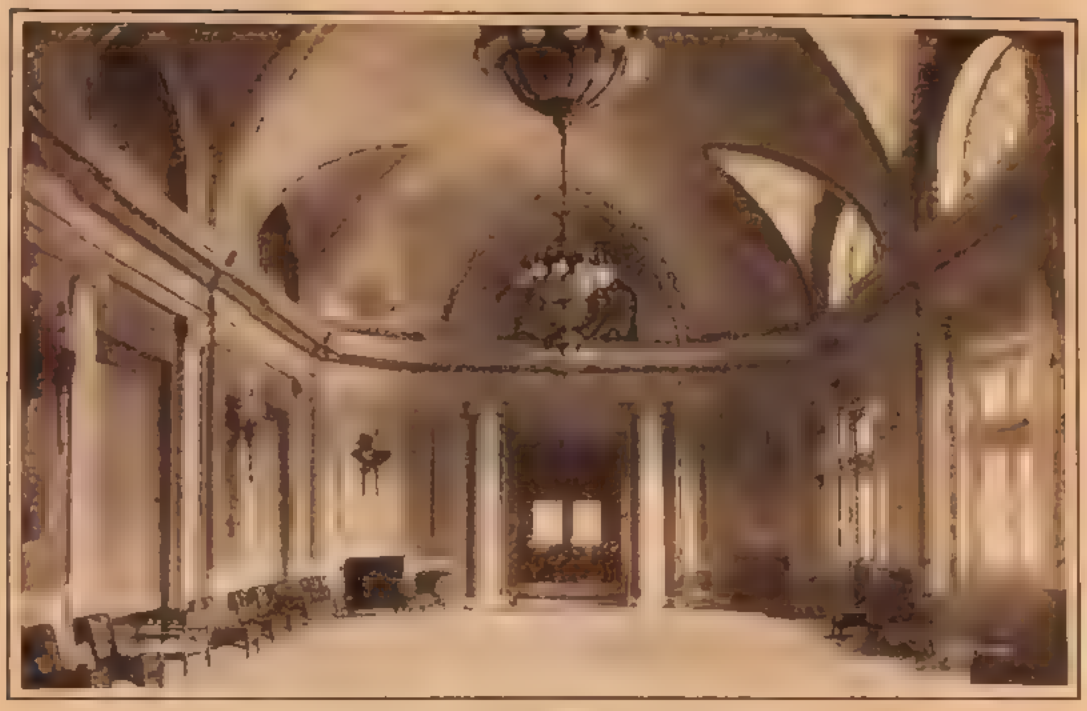
They have perfected their system of taking care of him to the extent that it is now practically impossible for the President to suffer because of lack of forethought.

JACK WHEELER, THE SECRET SERVICE OFFICER WHO IS IN CHARGE, PRACTICALLY, OF EVERY SPECIAL TRAIN ON WHICH THE PRESIDENT TRAVELS.

Photograph by Harris & Ewing, Washington, D. C.

The men who are responsible for his personal safety are the members of the secret service who are detailed for this purpose. At least one of these men is always near him. All were picked for their alertness and physical strength, and it would be hard to find in any country a guard which is more capable. These men have given years of study and attention to the details of taking care of the President.

James Sloan, Jr., is the chief of the squad, and Richard Jarvis and Lucien Wheeler are the other two regular members. The fourth is Joseph Murray of the Boston office of the secret service, who



INTERIOR OF THE PRESIDENT'S PRIVATE WA[illegible] STATION WASHINGTON, EVER SINCE PRESIDENT GARFIELD WAS ASSASSINA[illegible] OF THE BALTIMORE AND POTOMAC RAILROAD, THE NA[illegible] HIS TRAV[illegible]

acts as substitute, when any one of th first three is ill or for any other reason is unable to attend to his duties

Lucien, or "Jack," Wheeler, as he is best known by nearly every police chief, railroad official, and newspaper reporter in the country, is the pivot upon which the Presidential journeys turn. He is the man who travels ahead and makes the arrangements. "The Presidential Advance Agent" is a name that has frequently been given him, and he lives up to it. He is about five feet ten inches in height and tips the scales at about one hundred and seventy-five pounds stripped. Always in the pink of condition and immaculately dressed, he presents the appearance of a prosperous business man more than anything else.

When the President decides to travel, he makes his wish known to his secretary, and between them they decide how long his duties will permit him to be absent. Then the matter of the itinerary is taken up. Unless it is a hurry trip, provision is made for speech-stops along the route. This matter is turned over to the White House office force and a tentative itinerary is prepared. This rough schedule is made up from a list of the invitations which have been extended to the President by local organizations. These invitations come in to the Executive Offices from all parts of the country at the rate of from one to a hundred a day.

Then the traveling passenger-agent of the railroad on which the Presidential trip is to start is called into consultation. He is given a copy of the tentative schedule. He takes up the matter with each of the other railroads over which the President is to travel, and makes arrangements with the Pullman Company to supply a special car. Each railroad submits a list of trains to which the President's special car may be attached

From this information the final itinerary of the trip is compiled. The temporary itinerary has to be cut when it is found that the proper connection cannot be made, for the President of the United States is a very busy man. The next step is the acceptance of the in-

vitations where his time and route will permit.

About two weeks ahead of the trip Jack Wheeler usually covers the ground He has no special car, but travels like any one else. When he reaches the President's first stopping-place, Mr. Wheeler at once confers with the chief of police. The two definitely outline the police arrangements. Then there is a call on the members of the various local committees who are to welcome the President. After that Mr. Wheeler starts at the station where the President will leave the train and personally goes over the President's entire line of march.

He makes a map of the route with notes of the character of the streets and the people who live on them. He communicates with the nearest office of the secret service and makes arrangements to have a certain number of their men on duty. In such cities as New York and Chicago the police are sometimes asked to patrol the roofs of the houses along the line of march. Mr. Wheeler looks up the criminal records of all the local "suspects," and they are shadowed by the secret service operatives, both preceding and during the President's visit.

Then comes the military protection. Congress will not allow the President of the United States to travel with a big military escort, such as other rulers have. The people of this country insist upon seeing the President. It would not please them to see him surrounded by a heavily armed detail of soldiers A certain number of troops, however, is sometimes required for police duty in the crowds. So Wheeler, in order to have

THE ENTRANCE TO THE PRESIDENT S PRIVATE WAITING-ROOM SHOWN ON THE OPPOSITE PAGE

Photograph by Harris & Ewing, Washington, D. C.

the necessary military force in attendance, must recruit them from the nearest army post, and if that is too far away, and it usually is, he has to depend on the local militia to supply the gold braid for the occasion.

Must Be Diplomatic, Too.

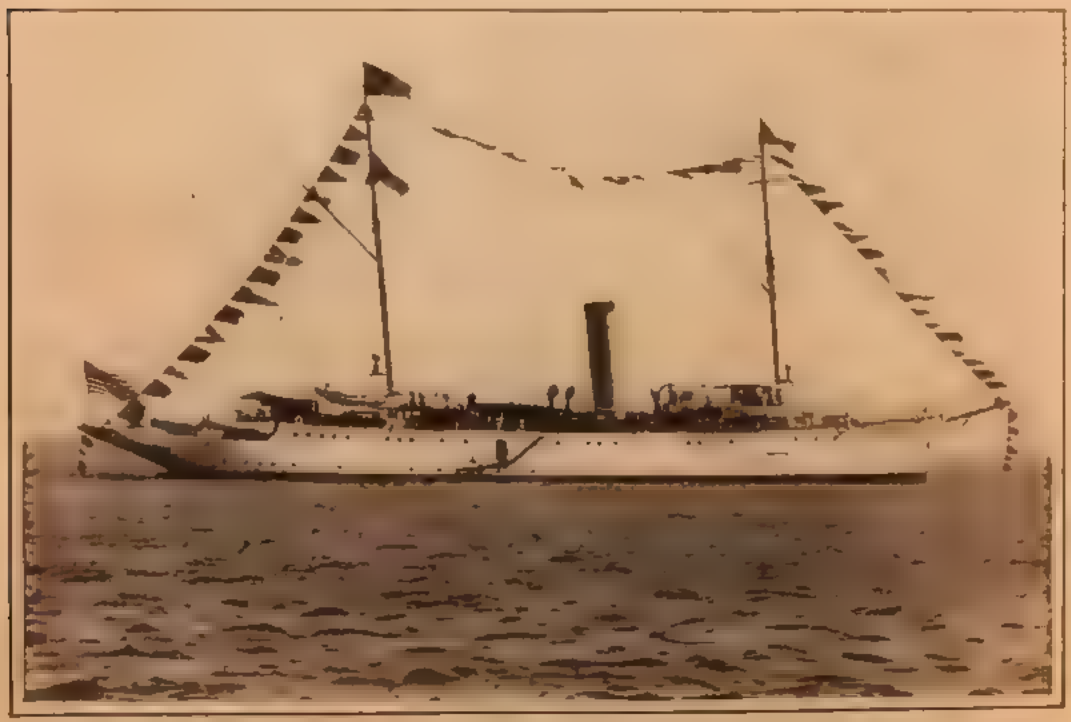
Where Mr. Wheeler's diplomatic ability comes into play is in the arrangements for the social side of the visit. The President is usually the guest of honor at a banquet, a reception, a dinner, or a luncheon. The secret-service man aids in the tactful seating of the guests. This is always a matter where great diplomacy must be used, because the President's visit always arouses great social rivalry. There is always more than one woman who lays claim to the social leadership. Wheeler often has the job of saying who shall sit at the President's right hand and who shall sit at his left, and so on around the table.

The ease with which he handles these social events and the absence of friction is abundant testimony to his ability. Such a program has to be repeated in every city that the President visits. It is very elaborate in the event of a special or prolonged journey.

Congress appropriates $25,000 yearly for the President's traveling expenses. It is the equivalent of a coast-to-coast trip each year. During his tenure of office he has covered about 100,000 miles, and at the end of his four years as President he will have spent $100,000 for transportation.

There may come a day when provision will be made for better facilities for the President's railroad journeys. As it is, his car is hooked onto all kinds of trains, usually on rear ends where the danger is greatest. He must eat his meals and conduct his business in the little room at the observation end. Every time the train stops there is always a certain number of local notables who call on him, and this impromptu reception must be held in this same small space.

Plans have already been drawn for a special train for him, and, without doubt, it will not be long before he has a train which will be in keeping with his private



THE MAYFLOWER, UNITED STATES WAR-SHIP, WHICH IS CONSTANTLY AT THE DISPOSAL OF THE PRESIDENT AS A PRIVATE YACHT.

Photograph by Harris & Ewing, Washington, D. C.

THE GOVERNMENT TUG PHOEN[illegible] WHICH IS USED ONLY BY THE PRESIDENT
[illegible] wing, Washington, D. C

yacht, his automobiles, and his private entrance and waiting room at the Washington Union Station.

The plans and specifications for this proposed special train call for three cars of steel construction, dust and draft proof. The first, the one nearest the locomotive, to have quarters for the attendants, clothes closets and a room for baggage. At the front of the next car would be a kitchen, and next to that would be the dining room, which, between meals, could be used as a conference chamber.

Next to this, and in the same car, would be the business office where the force of stenographers and clerks would do their work. This room would be fitted up with every facility for handling business that would not wait until the President's return. Telephones would be installed that could be connected at any station and duplicators would be used to make copies of the speeches to be given to the newspapermen. There would be a miniature library, composed of the latest Congressional directory, the White House lists, copies of important bills pending, dictionaries and reference books. Back of this would be a small room equipped with surgical appliances for the physician of the party. This room is as necessary as any other part of the proposed train because of the advantage of having everything of this kind at hand in case of accidents or sudden illness. Just behind this and at the end of this car would be quarters for members of the President's party

How a Train Is Arranged.

The last car would be fitted up with berths at the forward end for the secretaries and the secret-service men, and a separate compartment for the President's sleeping quarters. The remainder of the car would be used as his office, and his chair would be so arranged that people could see him from both sides of the track without his even looking up from his work. The rear platform would be specially arranged to facilitate receptions and speechmaking. There would be plenty of room with an entrance at one side and an exit at the other, so that his callers could see and talk to him, coming and going without confusion and as quickly as possible.

The platform at the end would resemble the speakers' stands at outdoor gatherings. With the corners rounded and designed so that the proper acoustics would be obtained, the President could

speak and be heard without a tremendous effort.

This train could always be kept in the Union Station at Washington on a track that could be easily reached from the President's private waiting-room. The estimated cost of the train is about $100,000.

The railroads west of Chicago give Mr. Wheeler *carte blanche* in the matter of the number of employees necessary when the President travels over their lines. There is a track-walker on every mile of track and a switchman at every switch. The switchman watches and waits for hours for the special car, and leaves only after the President has passed safely. To facilitate the movement of the President's train, a high official of the road usually travels with the party.

As the railroad on which the journey starts, makes all arrangements with the other roads over which the journey takes the party, so does that railroad make up the charges for the entire transportation. The other roads send in their bills and the charges are made up and sent to the White House. After the statement has been passed by the auditing department, the bill is paid at the Treasury, and the amount is charged against the $25,000 appropriation.

In Europe, when a ruler travels, his secretaries notify the railroad officials and traffic is stopped. He travels in his luxurious private train surrounded by soldiers and every convenience and attention that can be placed at his disposal. Our President is never accompanied by pomp and splendor, but goes about in almost the same way as a private citizen.

In New York recently, against the wishes of his companions, he decided to stroll up Fifth Avenue. He had gone but a few blocks when a great crowd collected at his heels. Many crowded in close and attempted to shake hands with him. His companions became alarmed at the increasing crowd, and finally persuaded him to take refuge in the house of a friend until the Presidential touring car could be called to take him back to his hotel

SPIRIT OF THE RAIL.

BY F. B. LOVETT.

Written for the "Railroad Man's Magazine."

'TAIN'T the book of rules what does it,
'Tain't the president in "Chi";
He don't keep the moguls movin
Any more than you and I

'Tain't the hoghead at the throttle,
Nor the flagman at the rear;
They don't keep the wheels a rolling
Round the mountaintops out here

If the super's here or isn't,
Things go 'long about the same
Hit the ball when he is absent,
Hit it when he's back again.

'Tain't the fear of gettin' browned es
If we fall down on the job,
Makes us all pull close together,
Old heads with the awkward squad

It's the spirit, boys, that hovers
O'er the barren right-of-way;
While the ties are tamped and pounded,
And the rails we swiftly lay.

Ever in the van and onward
It bids men to do and dare—
It's the spirit of the rail, boys,
And it hovers in the air

It travels to the towers,
To the roundhouse on the plain,
To the busy superintendent,
And it whispers mighty plain

You must keep the wheels a rollin'
And the signals shining bright
When they're clear, just keep 'em
movin',
But be sure the road is right

Keep the schedule right before you,
And your orders close at hand
Note the changing signal's message,
Should you fail to understand.

There is death and grim destruction,
Warns this spirit of the rail;
And but few forget the portent
While they ride the iron trail

READY FOR A TESTING TRIP ON THE L[illegible] ANY ONE OF THE MEN SHOWN IN THE PHOTOGRAPH PLAYS AN IMPORTANT PART IN [illegible] OUT WHAT THE LOCOMOTIVE CAN DO

ON A TESTING TRIP.

BY "PUFFING BILLY."

"WHAT was that contraption on the front end of 16 to do.

"Oh, some kind of test, I guess. Trying to find out the pressure in the cylinders, a fellow told me."

How many times this question is asked on main lines throughout the country, and how seldom is it answered even as understandingly as in this case

"Taking movin' pictures from the front end," is a favorite reply

I am going to give you some idea of what is going on in that little black box perched upon the bumper, and what the occupants who are frequently seen to thrust their goggled and grimed faces above the edge are doing besides reviewing the flying landscape.

Probably if the man who asked the question had not been looking so intently at the "contraption on the front end" he would have noticed that there were, moreover, a number of extra men in the cab of No 16, and that, sandwiched in between the engine and the regular make-up, was an extra car which looked like a cross between a baggage-car and a caboose. This was the make-up for a complete road-test

When a road purchases new power or converts old engines into new types, the operating department wants to know the rating, that the new machines may be given full tonnage on the start without any delays due to overloading or time spent in experimenting with gradually increasing loads under different conditions.

In the case of passenger-engines, the department must know how the new engines compare in hauling capacity and speed with others whose characteristics are known, before assigning them to a regular run.

These facts are ascertained most readily by the use of a dynamometer car, which by means of spring or lever scales, or a hydraulic cylinder, actually weighs the pulling force of the engine at the draw bar.

At the same time it is necessary, from indicator cards showing the *mean effective pressure*, to measure the cylinder power of the engine in order that it may be ascertained whether the draw-bar pull exerted is the maximum of which the engine is capable, and what improvements, if any, may be made in the steam distribution, that the draw-bar pull may be increased or greater economy in the use of steam effected

Many Things Must Be Noted.

Moreover, by comparing the *indicated* horse-power with the *dynamometer* horse power, which is derived from the draw-bar pull, a significant quantity known as *engine resistance* is obtained.

This is an uncertain and variable factor and sometimes almost justifies the engineer's statement that "she isn't feeling just right to-day."

Then, in a thorough road test, much other data is necessary in order to make a complete record of working conditions so that certain effects may be traced to their causes and certain causes to their effects.

Of course, one of the most important items in any locomotive test is the accurate measurement of the water and coal used.

Then the draft in the smoke-box, fire-box, and ash-pan is measured by means of U-shaped glass tubes, or *manometers*, partly filled with water. Having this information, it is usually possible to detect the cause of "not steaming" without resorting to methods known to the engineering force as "trial and error," or to the world at large as "guess work."

The temperature of the smoke-box is also frequently required. By this measurement we can estimate the waste of heat from this source. The smoke-box gases are also sampled and afterward analyzed.

It is better, therefore, to fire "single shovel" when you have a "coop" on the front end, for the testing crew is keeping tabs on the fireman's CO. However, this is just what a fireman does not want to do if it is not the practise on his division, for what we are after is average road conditions, and both fireman and engineer had better try and forget that we are on the engine.

Then the quality or wetness of the steam in a saturated steam-engine is obtained by means of a calorimeter. If the engine has a superheater—that is, a *real* superheater, not a "steam warmer"—the steam is always dry; then we ascertain its temperature or superheat by means of a thermometer thrust into an oil-well in the steam-chest, or by an electric pyrometer, the reading instrument of which is mounted in the cab like a steam-gage with wires leading to the steam-chest.

How the Men Are Stationed.

To obtain all this data, at least five men are required on the engine. There are usually about four in the dynamometer car, although in the case of Mallets, the men on the engine may be increased to ten or more. The men upon the engine itself are stationed and employed as shown in the table at the bottom of page 169.

All these men should have had some locomotive experience—actually on the road—before being allowed to act as test observers.

It is a mistake to think they must all be "technical" men. A clever apprentice, a valve-setter from the roundhouse, or a fireman looking for information, might make ideal observers, even "indicator men," after a little practise. They must "feel at home" on an engine, and they must have learned from experience to guard against accident.

The cab observer, particularly, should be a seasoned railroad man. Then he will know where to sit, will keep out of the left-hand gangway and off the footplate, thus getting along without friction with the crew. He will realize that he is there on sufferance only, and that he is using some of the fireman's space and

some of the engineer's patience; and that the engineer could order him to "hit the grit" if he thought it necessary to the safe operation of the train.

With this preliminary statement of the purpose and equipment of the test, we will go forward to the little box on the pilot. This is built entirely across the engine when it is to shelter two indicator observers and a time-log keeper. Sometimes it is built only over the left cylinder. It is made of matched lumber and strongly ironed. It is necessary to protect the men from the wind which, unobstructed, would make it impossible to carry on the work on a high-speed engine.

In this box, just ahead of the cylinders, with his back to the approaching landscape, sits the "indicator man" humped over his instrument. The time observer usually acts as lookout to warn all concerned of impending danger. He also gives the signals for "taking cards" at regular intervals by displaying a blackboard on which the number of the next card and the exact time it will be taken is chalked, so that it may be noted by all observers.

Above each steam-chest, in very careful tests, is located an indicator supported by its three-quarter-inch pipe connections with each end of the cylinder and the steam-chest.

The steam-engine indicator—which is to an engineer what the stethoscope is to a physician, or what the microscope is to the bacteriologist — is really a very simple instrument.

It was invented by James Watt, and its principle remains the same to-day, although it has been so refined that it resembles its progenitor of Watt's time as the modern standard watch resembles grandfather's clock.

Its use requires considerable practise, and its finer application a particular knack which cannot be acquired by some, although others are born with it. It is a somewhat delicate instrument and will not stand persuasion with a monkey-wrench.

Making the Records.

The indicator consists of a vertical steam-cylinder in which a piston of one-half square inch or one square inch area moves a small amount; a piston-rod with a lever connected to its upper end, for multiplying this movement; and a card-holder or drum revolved by the engine cross-head, upon the attached card of which the movement of the indicator-piston in relation to that of the engine-piston is recorded by a pencil

The cylinder is placed in communication with first one end and then the other of the locomotive-cylinder by means of a three-way cock.

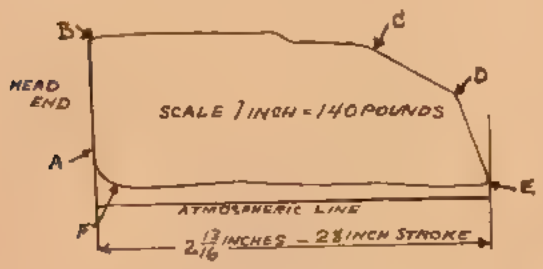
As the steam from the engine-cylinder raises the indicator-piston it compresses a carefully calibrated spring to an amount corresponding with the pressure in the cylinder; this relative height, multiplied several times, is marked by means of a pencil in the end of the multiplying lever on a card held by clips to the ver-

Title	No. of Men	Station	Employment
Indicator observers	1 to 4	Over cylinders	Taking cards
Timekeeper	1	Front end	Giving signals and reading revolution counter
Cab observer	1	Cab	Noting position of throttle, reverse-lever, steam-pressure, etc., when cards are taken.
Coal and water observers	2	Tender	Measuring water in tank at water-plugs; keeping count of sacks of coal used
Extra observers	1 to 4	Various locations	Reading draft manometers, pyrometers, calorimeters, etc.

tical drum, which is one and a half or two inches in diameter.

This drum is revolved by means of a cord fastened to a finger on the "reducing motion" (so called because it reduces the motion of the cross-head), making nearly a complete turn as the cross-head moves one way, and then reversing its motion as the cross-head makes the return stroke.

The combination of the vertical movement due to steam-pressure and the horizontal movement due to the motion of the cross-head, traces the familiar indicator diagram. An example is given in this drawing:



A is the point where steam is admitted to the engine-cylinder. As the cross-head is nearly or quite at the end of the stroke and, therefore, stationary, the pressure mounts rapidly, making a straight vertical line to B, where the forward stroke begins. The pressure is maintained quite high until cut off, C, then it drops as the steam expands to D, where the exhaust opens. The return or exhaust-stroke begins at E and continues to F, where compression occurs, and so on over again.

Diagrams from both ends are usually taken upon one card.

The method of procedure in taking cards is as follows:

At the preliminary warning, given by the time-log man by means of an air-whistle or bell, the operator "hooks up" the cord, starting the drum revolving, and opens the three-way cock to the "head" end of the cylinder.

The piston starts reciprocating with the fluctuations in pressure—up at admission and down at exhaust. On receipt of a second signal, he presses the pencil lightly against the paper on the drum by means of a small handle on the "parallel motion" of the indicator, during one complete revolution of the engine or more.

Frequency of Taking Cards.

He then reverses the three-way cock to the "crank" end, and takes this card as quickly as possible, probably occupying six to ten seconds for both ends. He then traces the steam-chest line by placing the three-way cock handle in closed position, opening a second cock connected with the steam-chest.

Next the three-way cock is opened to the atmosphere and the atmospheric line, which forms the base for all measurements of pressure, is traced.

Cards are taken at three, five, or ten-minute intervals over the entire division. This gives almost a continuous record of the power the engine is exerting.

The indicator operator is a very busy man at times. Cords will break, springs get loose, the indicator piston must be oiled from time to time, and frequently —as when there are steam leaks about the cylinder or a draft through the box —it is extremely difficult to insert the specially prepared paper cards under the clips of the drum.

Whatever happens, he *must* be prepared for the next card when the signal is sounded, as a "lost" card means a serious break in the record. His hands get scalded; his neck gets burned by hot cinders dropping into his collar as he stoops; he is always either half cooked or frozen to death; and when the end of the run is reached he can scarcely rise from his cramped position—but he wouldn't trade his job with the lookout in the dynamometer car, whose only duty is to hold down a cushioned stool, stick his head out the window, and note the mile-posts, stations, and curves.

The Indicator Man.

An indicator man worthy of his hire, takes delight in his work and prides himself on the delicacy of his "touch" and the cleanliness of his cards. He is generally fussy about the care of his instrument. He wears gloves to handle the three-way cock, oil-can, etc., saving his hands to apply and remove the cards from the drum.

At his right hand rests a small, dirty,

and very dilapidated grip filled with miscellaneous junk wire tassorted gages), cord, nails screws, bolts, t pieces of old indicators, wippers wrenches, screw drivers, emery-cloth oil cans and many other things

He can fix any ordinary breakdown i his instrument or the locomotive "between cards" without leaving his seat No matter how busy he is he always has time otter advice and ke He is the office "knocker" of the expedition. His fa always wears a scowl but he is supremely happy inside

Wait till the bunch gathers in the "sh parlor"—which is located on top of the tender tank back of the coal board to stow away a half stale bread with oleomargarine and a few "s or until they line up at the junction lunch room for a cup scalding chicory and a waterproof doughnut, and you will find that the indicator man's worries have not interfered with his appetite

When the dynamometer car boasts a *chef*, as is sometimes the case when the test is conducted on some isolated division far from the bright lights, and meals are served in state, then the indicator man in his glory

THE INDICATOR MAN AT HIS POST OF DUTY IN A DYNAMOMETER CAR

NECESSARY TO SHELTER TWO INDICATOR OBSERVERS AND A TANK LOCOMOTIVE

Because of his more arduous duties, he demands the best seat and usually preempts a sufficient space on the "divan" to stretch out at full length, while those engaged in less active occupations—such as the coal observer who has only to empty one-hundred-pound sacks of coal all the morning and climb the tank ladder fifty times at every water stop—stand up.

Of course, allowance must be made for the fact that of all the crew he is possibly the only one who is an old hand at the game. The others make one test and drift to other occupations where testing becomes out of their line of [illegible]tion—the indicator man is the only one who "comes back."

Even after he assumes the dignity which goes with the title "mechanical engineer," he may be unable to find a man of sufficient experience to do the work.

If he is one of the old school, I imagine that he does not look very far to find a man. He just gets out the old indicator, the familiar "perfume" of porpoise oil assails his nostrils, he knows how fresh the air will be about 5 A.M. down on the valley division on train 23, how it will drive into his lungs as he sticks his head above the box, and how the dewdrops will sparkle on the grass when he looks over the big meadow at NY tower—and he is back on the job.

Yes, he will run the test on 23 and 24. It's hard to get up at 3 A.M., but 23 arrives in Mecropolis just in time for luncheon. He will take the boys to the grill back of O'Neil's, and there will be time for a game of billiards before it is "back to overalls."

Yes, he tackles the job in person and some youthful aspirant for road experience is so disappointed that he is finally taken along to read the calorimeter.

Getting Away from Danger.

The occupation of testing locomotives, particularly on passenger runs, is both hazardous and fascinating. A slight accident unknown to those back in the coaches, such as picking up a "speeder," a cow, or even striking a pile of rock ballast heaped too high, might easily prove disastrous to the man on the front end.

Cylinder-heads sometimes blow out and indicator pipes burst, and the scalding steam is deadly. Loose car doors are another menace to life and limb. Accidents are few, however, probably because tests are not run every day.

I know of only one serious mishap to an indicator man. He lost both legs in a slight butting collision. He will take no more cards, but he is "still in the game," and more useful than ever to his company.

I am a great believer in a "lookout" on the front end to warn against danger. It is often asked: "What good would it do to be warned?" "What would you do?"

I have discovered that even on the fastest limited trains, there is time for a live man to cover the distance from the pilot-box to a position of quasi-safety by straddling the boiler back of the sand-box before meeting up with an obstruction. This can be done in two movements on some engines and in three on others; but they are long, free, lively movements on any locomotive and the arms come into play more than the legs.

Figuring the Horse-Power.

This "getaway glide" was once put into practise on an extremely fast run when the writer was working without a lookout. Chancing to glance ahead I had an impression of a wagon with a hay rigging" crossing the tracks in the middle distance. Paying no particular attention at first, I finally noticed that it had stopped with the rear wheels on the rails. Imagine my surprise when I saw the "hired man" calmly fumbling with the lock of a field gate which barred his way!

He got it open and spoke to the team, but—

After completing the road work of a test, the real labor begins. This is the tabulation and working up of results from the data in the log-books.

Some roads, notably the Pennsylvania, have a regular system with dozens of printed forms for this work. The information from each test or series of tests by this means can be readily compared with any other test which has ever been run on the system.

One of the biggest jobs connected with this work is figuring the indicated

horse-power of thousands of indicator cards. This work, together with the working up of the dynamometer record, will keep the test force busy for a longer period than was occupied by the trip from which the data was collected.

It is often the practise to "lay in" the engine every other day, or to allow her to make a run without the test force, and to work up the data on the alternate days. This method is the most popular with all concerned, for nothing is more tedious—accustomed as they are to outdoor air and exercise—than for the boys to be cooped up for weeks [illegible] seemingly endless strings of figures.

But everything comes to an end, even the hope that some of the trips may have to be run over again owing to the lack of important data; the final summary sheet is finished, blue printed, and takes its place in the files of the motive-power department, copies being sent to all interested parties.

The engine is found to have done all that was claimed for her by the builders; but opportunities are presented for further improvements to be embodied in the next order—perhaps a little larger fire box, a little more cylinder clearance, additional evaporating surface, a little less superheating surface.

WOMEN HUNT ON RIGHT-OF-WAY.

WHEN the pioneer railroaders of Africa threaded the steel rails of progress through the dense jungle, wild beasts were one of the greatest perils that confronted them. The animals invaded the camps and made frequent attacks on men working on the right-of-way. Though the railroads have brought civilization to many places that were once the lairs of the lion, big game still exists, and occasionally terrorizes the natives and inhabitants of the small towns along the line. The accompanying illustration was sent to us by one of our readers in South Africa. For several weeks a lion and his mate were seen near the outskirts of the town. A party of men killed the male, but the female escaped. Two venturesome young women announced that they would stalk her majesty of the jungle, and despite all warnings, trailed the lioness to her den, shot her and brought her in on a hand-car.

UNUSUAL TYPE OF LOCOMOTIVE INTRODUCED ON THE ITALIAN STATE RAILWAYS, WITH CAB IN FRONT. WHEN IN OPERATION THE ENGINE APPEARS TO BE RUNNING BACKWARD

RUNS BACKWARD TO GO FORWARD.

THERE are very few modern American locomotives of unusual design. After many years of experiment, during which many most extraordinary engines were proposed, we have adopted certain fundamental types, and unless there is a complete revolution in the construction of our locomotives, it is hardly possible that the engines of the future will be much different from those of the present.

In Europe and other foreign countries, however, they still continue occasionally to build an engine that embodies very unusual features. One of the latest is shown in the accompanying illustration.

It was constructed for the Italian State Railways, and the cab was placed in front that the engineer might have the clearest possible view of the track ahead. It is a four-cylinder compound, with the cylinders arranged in a peculiar manner, the two high-pressure cylinders being on one side of the center line and the two low-pressure cylinders on the other. Coal is carried in bunkers in the cab, though in this respect the accommodations for fuel are decidedly limited. Water is carried in the circular tank-tender which is fitted, according to the Continental custom, with the small cab shown. The tender-cab is not occupied when running. When in operation, the engine presents a very strange appearance, for while it is actually running forward, the action of the driving-wheels would be considered backward in this country. The engine seems to run backward to go forward.

CUMBERLAND VALLEY'S FIRST ENGINE.

Old Slab-Track Locomotive Could Make Sixty Miles an Hour with Only One Man in the Cab.

It was sixty years ago that Seth Wilmarth, a Boston inventor, designed and constructed the "Kitty Did," which, at the time, attracted unusual attention in railroad circles.

The engine was the first used on the Cumberland Valley Railroad. It was placed in regular service between Chambersburg and Harrisburg, Pennsylvania, a distance of fifty-two miles, where it rendered efficient service. It continued in active service for twenty-nine years.

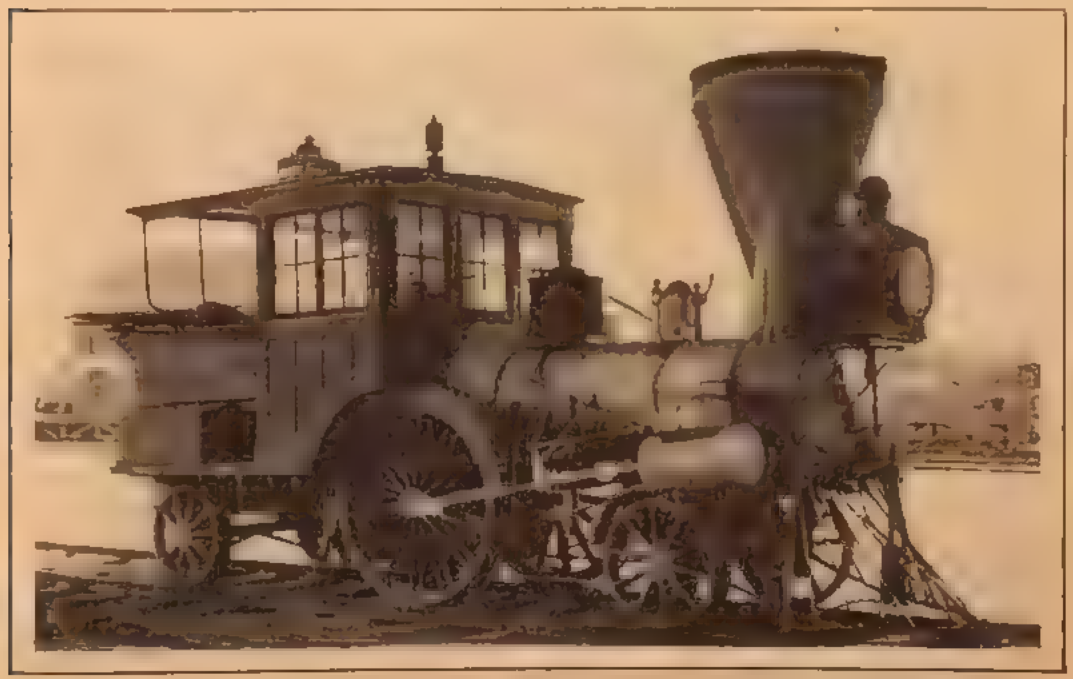
During the Civil War, the "Kitty Did" figured prominently in hauling Federal soldiers, and when Chambersburg was burned this locomotive pioneer made a remarkable escape from the conflagration. It is one of the few pioneer engines still in existence.

A short time after William Hadley, of England, built a flat car, to ascertain the adhesion of an iron wheel on an iron rail being sufficient to enable a locomotive to pull any load, the "Kitty Did" made its appearance, and demonstrated, conclusively, the practicability of locomotive construction.

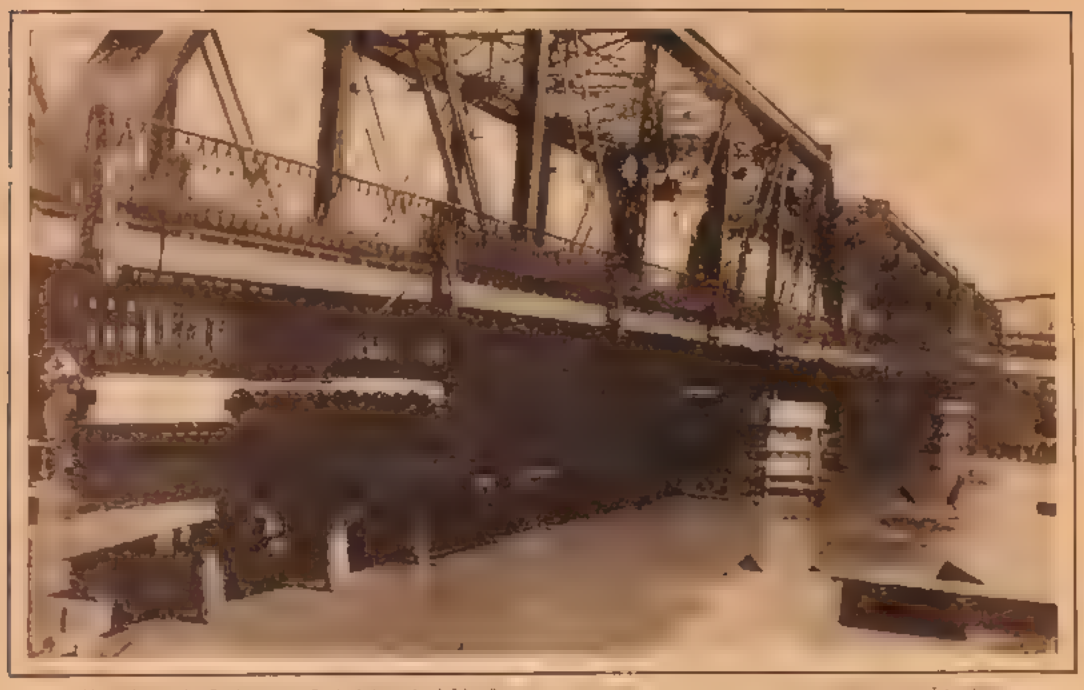
Paradoxical as it may seem, the "Kitty Did" had a remarkable record for speed. This antique locomotive is accredited of having attained a speed of sixty miles an hour under favorable conditions. Its last run was from Carlisle to Chambersburg, Pennsylvania, in 1900.

The engine has two cylinders, 8½ x 14 inches set at the front end of the boiler on an incline. The pair of driving wheels [illegible] inches in circumference. The engine [illegible] working condition 25,000 pounds; [illegible] She burned [illegible] The "Kitty Did" [illegible] $6,200, and ran on what were [illegible] It enjoys the distinction of having never figured in a wreck.

One man did both running and firing. It was quite easy for the [illegible] hogger-tallow pot to keep [illegible] on the throttle while he threw in wood with the other.



THE "KITTY DID" FIRST LOCOMOTIVE BUILT FOR THE CUMBERLAND VALLEY RAILROAD, DESIGNED BY SETH WILMARTH.



MOVING A BRIDGE ON CAR-TRUCKS.

Twelve Men Cut Loose a Railroad Bridge Spanning the Kansas River and Move It 120 Feet.

DURING the past year many remark[illegible] complished in the construction of the new union depot and terminal facilities in Kansas City, Missouri. One of the most unusual of the many tasks thus far accomplished was the raising and removal of the railroad bridges of the Kansas or Kaw River. In one instance a dozen men raised a bridge five hundred and forty feet long and moved it twenty-seven feet down the river. A few days later another party of men moved the entire structure over one hundred feet toward the east bank. The steel work alone weighed one thousand five hundred tons.

Besides the changes necessitated by the plans for the new terminal, the construction of dikes along the west bank of the Kansas River made it necessary to raise and lengthen half a dozen traffic bridges.

The first structure to be moved was the Missouri Pacific Railway bridge, made famous by the flood of 1903, when it was the only bridge that was not carried [illegible] the violent waters. The structure was saved by the weight of fifteen heavy engines which were placed on it that it might withstand the rushing river.

Under the direction of S. M. Bate the work of moving the big bridge was begun in September, 1911, when the new piers and necessary cribbing were begun. Not until April of this year were the contractors ready to begin the actual work of moving the huge structure.

On the evening of April 4, traffic across the structure was completely suspended, and on the following morning the tracks at either end of the bridge were parted.

The bridge had been raised and placed upon a large number of car-trucks, and with [illegible] stationary engines furnishing the motive-power, the big span was hauled to its new site. Only a dozen men were required to make the move. The lateral movement of one hundred and twenty feet was a comparatively simple task.

Just One Life.

BY GEORGE VAN SCHAICK.

Sue Was Willing to Wager Her Money, But Joe Was Unwilling to Risk His Future.

THE superintendent of the salmon hatchery was a mighty interesting man; but Joe, thinking of the girl, rose and knocked the ashes from his pipe.

"'Tis wonderful about all that life on earth," he commented.

"Yes," said the young man in spectacles. "Codfish, for instance, will average a million eggs, and the sea is full of other fish just as prolific. If a dozen from each spawning could reach adult age, the sea and its putrefying waters would overrun the land, where constant destruction is also the price of life.

"Think of men! A fraction more than one dies for every beat of your pulse; something like five for every breath you draw. You're thirty, and since you were born three-quarters of a billion of men, women, and children have gone to make room for others."

"Life's an awful big thing, and also very little," said Joe. "Well, so-long!"

He took the long path by the river, that roared in the wearing of boulders and grinding them to sand with crashing waves as cruel as the fierce jaws of monstrous things beneath the sea, of which the superintendent had been speaking.

While he walked on stolidly, as the dusk was gathering, a young man met a girl in the main street of the little village.

"You promised that you would wait for me!" he exclaimed excitedly.

"Joe is a better man, for all that your people own the mill," she answered, drawing up her pretty head. "I've finished with waiting, and with having folks talking. You've been scared at telling your people. They'd know all about it if they lived here. I ain't good enough for them, and now I'm going to marry one of my own kind. He's good, Joe is."

"I wish you joy with your lumberjack," he sneered.

"He's twice the man you are!" she cried angrily.

Harry Brown's laugh goaded her to greater excitement. Some of the mill hands, idling in the street, strolled toward them, attracted by her bitter voice.

"What's the matter? Havin' a family row already? Why don't you two wait till you're married?" asked a big foreman in mackinaws, with the easy familiarity of lumber camps.

"Marry him!" cried the girl. "I'm going to marry a man, I am. I'm going to marry Joe. I've told him so. He's the best man of you all, he is; best in the mill and best on the river—and you know it."

"Sure! the only real man as ever rode a log," jested the foreman.

"He'd have no trouble beatin' you at it," retorted the girl contemptuously.

"Course not," put in a bystander. "He could go down Dog Rapids on a spruce butt, a playin' of his accordeon with one hand and throwin' kisses with the other."

The guffaws that greeted this sally exasperated the girl.

"He could ride the rapids anyway," she cried. "And that's more than any of you would dare."

"You're a dead game sport, ain't you, Susie?" put in a third man. "What you bettin' he can ride a log down?"

With quivering lips, eyes flashing, cheeks mantled with red, the girl drew from her waist a roll of money and shook it in the man's face.

"I got a hundred dollars here!" she cried. "Joe gave it to me to buy the things for our house. There ain't one of you dares bet!"

Her discarded suitor promptly pulled a bill-fold from his pocket.

"I've got a hundred here that says he can't do it!" he exclaimed.

The big foreman grew serious; with one hand he grasped the girl's arm.

"Hold on! Put back that money, Sue. You're goin' too far. There's no one got a right to gamble on a man's life!"

"It's a long time since Brown's Mills had any excitement," put in the young man raspingly. "I'd like to treat them to a circus."

"Now, you sure don't mean that, Harry," said the foreman. "You know it ain't right!"

"What are you butting in for?" resented young Brown.

The big man's jaws gritted; but he kept still.

"I'll stick to the bet," cried the girl, stamping her foot. "I'll show you the kind of man I'm going to marry."

By this time a small crowd had assembled. The postmaster, who, pipe in hand, had strolled out of his little store, became an unwilling holder of the money. Some began to bet small sums on the event, while others quarreled as to the feasibility of riding the rapids, or stood by, hushed, staring, wordless, as if in the presence of impending tragedy.

Quietly and with the smile that seldom left his honest face, Joe Moore came down the street and scratched his neck as he came near. Men stepped aside to make room for him. They looked at him in a silence that was growing painful.

"Hello!" he said. "Fine evenin', ain't it? 'Twon't be no time to hot weather now, for the black flies is biting in the woods, daytime, and my neck is all mosquito bit. There ain't a mite of ice left in the river, and salmon are runnin'. Hello, Sue!"

For a moment he was puzzled at the stillness of the usually talkative crowd.

"Anythin' been happenin'?" he asked.

Finally a man spoke.

"You've gone an' lost a hundred dollars, Joe," he said.

"Me! I didn't have but a quarter in my pocket when I left, and there it is."

Suddenly an idea came to him.

"Did you go and lose that money, Sue?" he asked. "I've a notion you did by the looks of you. Pshaw! Somebody'll be bringin' it back, 'less you dropped it in the river. But don't you worry, Sue, for I got some more down to the savin'-bank at Lakeville. Guess it worries you more than me, but it don't make no real difference to speak of."

"She's been telling us what a big man you are, Joe," put in Harry Brown, "and insisted on betting me a hundred that you would ride Dog Rapids on a log."

"I got the money," put in the postmaster sheepishly, "and I wish 'twas out of my hands. Don't you be a fool, Joe. Susie, here, she got excited and a bit foolish for a moment. I'm glad you can do without that money, for I guess you've lost it, all right."

"Oh! Give it back to him if he's got cold feet," said Harry Brown.

Joe looked at him with a surprised stare, as if he did not quite understand but was trying hard to.

"Is that right, Sue?" he asked. "There ain't no kind of a catch or a joke to it, is there? I was always reckoned a bit slow when it come to guessin' things."

"Take your man for a walk, Sue," sneered Brown, "and take your money back, too. I don't care for it, and another time you won't talk quite so big."

"Joe! Joe! Show them what you can do," the girl burst out. "I told them that you were braver than any of them, and I know you are. If you don't try they'll never end laughing at us!"

"I reckon there's somethin' to that," Joe admitted. "A man's life ain't but a little mite of a thing, and it's tough feedin' to eat crow. Guess I'll risk it, all right. D'ye know, I've sometimes had a notion it could be done, leastways when the water wasn't quite so high. Sooner we try it, sooner it'll be over. A good time would be after noon-whistle to-morrow.

"I need new calks to my boots, I'm thinkin', and I'll go put some in, good

and sharp. There's plenty good straight butts in the boom at the mill, and I'll pick one out first thing in the morning. I got a fine settin'-pole, smooth and not a knot in it. Gettin' kind of late, ain't it? Guess I'll say good night, folks. We won't go walkin', Sue, 'count of my havin' to look after them boots."

He walked off in his strong, quiet gait, nodding good-humoredly to friends. Once within his little room he smoked his pipe peacefully while he drove new calks, sharp as needles, in the heavy soles of his river-boots.

"Life," he told himself, "from all accounts, don't amount to much. There's piles and piles of it that don't come to anythin', seems to me."

He critically inspected his boots to his entire satisfaction and a few moments later went to bed.

"I understand you, Harry," said Joe next day, standing on the river-bank and looking quietly at the turmoil beyond. "Of course, I reckon it's plumb foolish, but I guess Sue's heart is set on it, and there's been so much talk I'd better see it through. I don't bear you no grudge, but I'll say I think you've been kind of hard on the girl, and took some advantage of her being that quick in temper an' proud."

He was looking at Brown placidly, and before his steady glance the younger man's eyes fell. Then Joe turned away from him, nodding quietly to his friends the teamsters, gang-sawyers, scalers, and the flume-tender, who had run down as soon as the shrill mill-whistle shrieked the noon-hour.

Susie came to him, conscious of an undercurrent of public disapproval, wherefore she walked boldly, with head erect, in the flush of pride, her hands tightly clenched to check their trembling.

"Be careful, Joe," she said. "Be very careful and we'll show them yet."

The man's features slowly expanded into a smile, but he only nodded.

"'Twon't take long," was all he answered.

Then his slow movements seemed to shed away from him like a discarded garment, and he became catlike in motion. The long log's butt was grinding in the dead water on a bit of gravelly shore as he leaped upon it.

A hard, slow, gradual push of the iron-shod pole and the spruce-trunk was afloat in the peaceful eddying reach below the dam. Beyond, the white waters frothed, swished on, and curled.

Men watched with beating hearts; women looked, then hid their eyes; some children cried; others were laughing.

Joe was paddling with his pole, keenly looking ahead, paying not the slightest heed to the crowd that edged the banks and was preparing to run along and follow his course.

The log soon gathered speed and presently the end rose high over the crest of a wave. Joe was birling it as it began to spin beneath his feet, balancing himself with the pole. Then, like a horse taking the bit in its teeth, the log surged ahead faster and faster through a gruesome turmoil of black rocky heads showing above the sudding flood.

"He ain't near enough inshore," cried a man

"Yes, he is. The waves are too high at the end of the black water!" yelled another.

"He's down!" roared the crowd.

The end of the log had butted a rock-head; the after-coming flood uplifted the rear. It bucked like a wild mustang and Joe slipped into the caldron.

But—in a moment, despite the force that tore at him, he was astride again, the pole still in his left hand.

While the mob was shrieking, he took advantage of a bit of dead water and, in another second, again stood erect on the log. Instantaneously he was again in the toils, tossed and shaken, but always speeding toward wilder billows, so that some of the men running along the river fell exhausted, and their number dwindled as they sped on panting.

Another collision with a rock nearly threw Joe again, but he recovered his balance, though for a moment the log sank till he was waist-deep. But the new calks held, and once more he tore on toward the great ridge of white water passing over the ledge.

"He can't do it!" shouted a piler between sobbing breaths.

For a moment he birled as the log began to roll. Then, with a tremendous sweep of his pole, Joe aimed it straight at the wall of roaring waters. He seemed to disappear in the spume.

After a breathless second they saw him rushing again, still erect, a figure heroic. Presently the waters flowed more gently into the broad pool of dead water, and he was slowly poling toward the shore.

Howling men leaped into the water, eager to help him ashore. Then they bore him up the bank, while he sought to escape their hugging.

"Let me go, boys," he said. "I can walk and ain't hurt none, outside a scratch I got when I went in. Any one got a plug? I reckon mine washed out of my pocket."

They handed him tobacco and a knife and he quietly cut away a pipeful after he had shaken himself like a wet dog. People were still coming fast, eager to grasp his hand. But they made room when Sue arrived.

What cared she for the crowd now? She probably did not see it as she threw herself upon the man.

"Look out, Sue, I'm soakin' wet. I ain't hurt none," he said, puffing at his pipe. "I ain't sayin' as I'd like to try again. Just sit down on this here rock an' get your breath."

Harry Brown came up, very pale.

"Will you take my hand?" he asked. "I'm sorry for my share in this."

Joe laughed.

"What's the odds, lad?" he answered. "We're all right side up now."

The whistle was shrieking again, and the men started back in leisurely fashion, knowing that the timekeeper would be lenient that day. Finally the girl and the man were left alone.

"Think I better go back an' shift my clothes," he said. "This wind is travelin' through these wet rags. I just despise to go through the village lookin' like such a scarecrow."

But Sue was telling of her pride in him; how he was greater than all others; a wonderful being in her eyes as they walked along. In the village, Joe was distinctly embarrassed. Folks came out of the store and the blacksmith shop, and the cook at the boarding-house waved a pan at him and yelled.

"It's all right, boys, an' I reckon I had more luck than brains," he said. "Just let me run up and put on dry things."

The girl stood on the veranda. People looked at her curiously.

"What are you staring at?" she asked. "I told you I'd show you the kind of man I was going to marry."

After quite a long time Joe came down in his black suit of Sunday clothes, his best blue shirt, and a paper collar. In one hand he bore a voluminous grip-sack.

Sue looked at him amazed.

"Where you going, Joe?" she asked.

"Guess I'm bound for Lakeville."

"What for?"

Slowly he sat on the steps of the porch and fumbled at his pipe with his jack-knife. She sat beside him. Something was clutching at her breast and hurting.

"You got no notion what a little time it takes one to think," he said musingly. "When I was travelin' right smart on that log I got to thinkin' real hard. A man ain't got but one life, and that ain't hardly worth anythin'. You'd just wonder to know the millions that's getting snuffed out all the time.

"But just that one little life looms up kind of big when a man's scrappin' for it, and the only thing that can make it still bigger is love, I reckon. Now I mistrust I better go back to Lakeville because I got a notion that real love just naturally couldn't bear the idea of the other one gettin' hurted.

"You didn't feel that way, Sue, so I take it you was mistaken, just honestly mistaken, and one can't afford to make mistakes going through them kinds of rapids, and—and the train's making up to go now, so I'll say good-by if you don't mind."

He stood up and watched her kindly for a moment.

The girl's fingers contracted and her nails dug into the soft folds of her dress; her eyes sought the man's face, but the mist blinded them. Then came a groping gesture of one hand, which Joe perhaps misunderstood.

"Well, so-long," he said, and turned away with his slow, sturdy step. He passed into the gathering darkness while the girl suddenly became flaccid and limply fell.

Her pretty head rested on her bent arm on one of the steps, and for a kindly minute life and love and all great and small things of the world that bring agony and happiness were blotted from her knowledge.

TIES THAT BIND.

The History of the Great Railroad Orders of America.

8.—ORDER OF RAILROAD TELEGRAPHERS.

The Initiative of A. D. Thurston, a Lone Operator, Unites the Railroad Telegraphers into a Powerful Army of Over 50,000 Workers.

BY THADDEUS S. DAYTON.

UNNING trains is like a gigantic game of chess. The board covers the whole country. The trains are the pawns. Nearly 50,000 telegraph-operators move the pieces in the game. They are matched against one opponent—Time. The contest never ends, but the men at the keys render the time-card dependable. Without the incessant vigilance of the operators all would be chaos.

The players in this mighty game must remember innumerable moves. Once in a while a despatcher suffers a lapse of memory and places two pieces on the same square. Such errors are far more infrequent than they once were. Telegraph-operators are more efficient and less liable to err than they were twenty or thirty years ago.

There are many reasons for this, but most of them can be traced to the Order of Railroad Telegraphers. When that association was organized in 1886 it sowed the seed from which sprang a great deal more than its own individual benefit. The public in general does not even faintly realize the part that this order has played in making railroad travel safer in the last quarter of a century.

A. D. Thurston was the founder of the Order of Railroad Telegraphers. Most of the railroad man's organizations have been founded by a small group of individuals, no single one of whom stands out prominently. With the telegraphers it was different. No one has ever denied the honor due to Thurston.

It was Thurston who originated the idea. He called the first handful of members together and placed the association on a working basis. Through the years when it was struggling for existence Thurston guided the order with all the skill and tenacity of purpose that a sea captain shows when he stands watch,

"Ties That Bind" began in the RAILROAD MAN'S MAGAZINE for February, 1912. The following have appeared: Order of Railway Conductors, February; Brotherhood of Railway Trainmen, April; Maintenance of Way Employees, May; Brotherhood of Locomotive Engineers, June; Brotherhood of Railway Clerks, July; Brotherhood of Locomotive Firemen and Enginemen, August; Railway Mail Service, September. Single copies, prior to the July number, ten cents.

sleepless, through days and nights of storm and brings his boat safely into port. To-day Thurston rests from his labors, rewarded with the profound respect of the members of the order.

The first sixteen years of the order's existence were stormy and discouraging. It was not until 1902 that it seemed to be a success. It has more than doubled in membership since then. About ninety per cent of the despatchers, telegraphers, station-agents, interlockers, lever-men, and other eligibles in the United States and Canada belong to it. It has paid nearly $750,000 in death claims, and has in its treasury a surplus approaching $375,000. The average wage paid to operators is more than double what it was when the order was founded.

A. D. Thurston was the operator and station-agent at La Porte City, Iowa, in 1886. He was an expert telegrapher and understood his railroad duties thoroughly. He was paid thirty-five dollars a month. There were thousands like him in the rank and file of the railroad army. Thurston was more fortunate than many, for La Porte City was an attractive place in the center of a rich farming country, and the work was not excessive, although the hours were exceedingly long.

Thurston Makes First Move.

Thurston had worked where he had been almost as solitary as a sheep-herder. He labored on the deserts and on bleak mountainsides where two passenger-trains a day went by between midnight and morning. He knew from experience all that there was to know about being agent and operator at a small station. The drawbacks were the small pay and the long hours. Even with strict economy, thirty-five dollars a month in a small town do not exceed the cost of the necessaries of life. Thurston did not mind the responsibilities of the position, for he was accustomed to obey orders and to act quickly and effectively on his own judgment.

Thurston had time to ponder these things day after day and night after night as he sat at his key. He talked over the wire with operators up and down the line. It is as natural for operators to talk with each other in this way as it is for a group of persons seated around a stove in a country store to exchange ideas and gossip.

Thurston found, as he sounded the men here and there, that all of them felt that the working conditions of the craft were so intolerable and the wages so low that they should seek for a remedy. No one, however, seemed to have any clear idea of what to do. None was willing to take the initiative.

It was a difficult matter in those days to create such an organization as seemed necessary. The idea was comparatively new and the obstacles seemed insurmountable. But Thurston, with the executive ability and singleness of purpose that characterized his subsequent connection with the order, was not to be discouraged. He finally drew up a plan. It was complete in every detail. His idea was a labor organization with possibly the mutual benefit feature as a side issue

Twenty-Eight at First Meeting.

He explained many times to the other operators by wire. Most of them clicked back that it was too good ever to come true; that he had better abandon his dream, for it never would be realized. Thurston continued to urge and argue, and finally convinced twenty-eight operators that he was right. The next step was to call a meeting.

Cedar Rapids, Iowa, was selected as the meeting-point, and Sunday, June 9, 1886, was the day chosen. Cedar Rapids was quite a railroad center at that time, and most of the twenty-eight telegraphers could reach it without difficulty. Several of them had their headquarters there.

The meeting was held, and the Order of Railroad Telegraphers was created. It did not take long because the details had been thoroughly arranged. Even the official organ, *The Railroad Telegrapher*, had been planned, and its cost and prospective revenue carefully estimated.

There were no interlocking system of signals, no telephones or other innovations in those days. The telegraph was supreme in the movement of trains. Therefore, when the order was founded, only railroad telegraph-operators were admitted to membership.

There was no rush to join the new

order. For the next ten years, it seemed as if every member was won by persistent individual argument. Every new member had to be filled with the enthusiasm of the original founders so that he might become a magnet to attract others. There were no paid organizers traveling from place to place. Each new member solicited his friends by wire. When an operator is convinced that he is right, his Morse becomes as emphatic as his speech.

Popular wtih Railroads.

If it was difficult to secure new members it was still harder to improve the working conditions and increase wages. The members who headed the committees were admirably persistent. The railroad officials were prompt to see that these men were intelligent and capable and had a reasonable basis for the demands. The executives might differ with them, but there was no discourtesy on either side. Thus it has come about that the heads of the Order of Railroad Telegraphers have ready access to those in charge of the railroads.

During the first decade of its existence the order had the usual vicissitudes peculiar to such associations. There were victories and defeats, discouragement and elation, but finally system began to come out of chaos, and the order found itself.

In 1896 it had but 5,467 members, only a small percentage of those who were eligible. It gained only eighty-one members in the next year. In those that followed, the growth was steady, but not especially rapid when the possible extent of the organization is considered. In 1901 it had 10,339 members. The next year it gained nearly 9,000, the next more than 10,000. Since then the membership has been increasing steadily. Hard times and lack of employment were obstacles, but work and wages gave it a new impetus. The following tabulation of membership tells the story:

1896	5,467
1897	5,548
1898	8,134
1899	10,010
1900	10,520
1901	10,339
1902	16,665
1903	20,718
1904	31,315
1905	28,338
1906	31,224
1907	37,522
1908	34,193
1909	33,440
1910	36,638
1911	40,227 (to April 30)

It is expected that the membership will reach 50,000 this year. There are 161 local divisions of the order, sixteen of them being in Canada, which includes those in Prince Edward Island and Nova Scotia. Some of these divisions are very large. Division No. 6 covers the Union Pacific Railroad system, its general chairman being located in Denver, and No. 7, with headquarters at Welland, Ontario, takes in the Canadian Pacific. Division No. 8 covers the New York Central, and is subdivided into a number of smaller divisions. This is also the case with most of the other large railways, such as the B. and O., the C. and O., the Illinois Central, the Big Four, and the Delaware and Hudson.

$2,000,000 Added to Pay-Rolls.

The order has wage-scales and schedule agreements in force on nearly all the railroads in this country and in Canada. It is constantly adding to them. In 1910 it completed seventy-eight successful schedule negotiations, which was the largest number during any year of its history. Some of these agreements were new and some were revisions of those already in existence. They represented an addition of more than $2,000,000 to the pay-rolls of the telegraphers in the United States and Canada.

The order now admits eight classes of railroad employees to membership — telegraphers, train-despatchers, agents located at railroad-stations, line-repairers, lever-men or interlockers, tower or train-directors, telephone-operators, and staffmen.

A mutual benefit department for the purpose of furnishing death benefits for members was regularly instituted in 1898. Previous to that time it was optional with the local organizations, many of which had sick and many other benefits that seemed to make membership in the order desirable.

The death benefits of the order are divided into three classes. The smallest

amount is $300, on which the annual assessment is twenty cents a month; the next is $500, which costs thirty cents monthly. The highest, $1,000, costs sixty cents a month. There are nearly 32,000 members in the mutual benefit department at present. Up to August, 1911, $729,681.47 had been paid out for death claims, leaving a surplus of $316,688.67.

Closely Affiliated with Other Orders.

The benefit fund is administered by the insurance committee, which consists of the grand president, the grand secretary and treasurer, and the board of directors of the order. These officers are elected by ballot at the biennial conventions. The president is bonded for $10,000 and the secretary and treasurer for $75,000.

Applications for membership in the benefit fund must accompany all applications for membership in the order. Should the application for membership in the benefit fund be rejected, however, the application for membership in the order is not affected. To become a member in the benefit fund the applicant must be in good health—only in doubtful cases are medical examinations required—and not less than eighteen nor more than sixty years of age. The total entrance fee, which is paid into the grand lodge, is $1.75, and the annual dues are $5.50. These are paid semiannually in advance through the local organizations.

The Order of Railroad Telegraphers, through the Railroad Employees' Department of the American Federation of Labor, is closely affiliated with other associations connected with the railway service, such as the Brotherhood of Blacksmiths and Helpers, Brotherhood of Railway Clerks, Switchmen's Union, Brotherhood of Maintenance-of-Way Employees, Association of Steam, Hot Water, and Power-Pipe Fitters and Helpers, Brotherhood of Railroad Freight-Handlers, Brotherhood of Boilermakers, Association of Car-Workers, Association of Machinists, and the Brotherhood of Railway Car-men.

The general offices of the Order of Railroad Telegraphers are in St. Louis, Missouri. The grand officers are: H. B. Perham, president; L. W. Quick, secretary and treasurer; J. A. Newman, first vice-president; T. M. Pierson, second vice-president; D. Campbell, third vice-president; J. J. Dermody, fourth vice-president. With the exception of the first and third vice-presidents, who are located at Chicago and Toronto, respectively, the remainder of the officers have their headquarters in St. Louis.

The board of directors is more widely scattered. It consists of A. O. Sinks, chairman, Portland, Oregon; George O. Forges, Spring Hill Junction, Nova Scotia; C. E. Layman, Troutville, Virginia; C. G. Kelso, Springfield, Missouri, and George E. Joslin, Centerdale, Rhode Island.

Both President Perham and Secretary and Treasurer Quick have held their respective positions for a number of years. Mr. Quick, two or three years ago, was elected city treasurer of St. Louis. It is a Democratic municipality and Mr. Quick ran on the Republican ticket, but was so popular that he won by a large majority. He was also editor and manager of *The Railroad Telegrapher* for many years.

Membership Is Certificate of Efficiency.

Such things may seem trivial to the general reader, but they are of great importance to the order. The average telegrapher has not only traveled widely, but he has a large circle of acquaintances. He may never have seen many of the people he knows, but he has talked with them many times over the wire and knows their "Morse" just as surely as he would their handwriting. Therefore, in a big family of nearly 50,000, every item of news is of utmost interest.

The ladies' auxiliary of the order held its first biennial and second regular session at Toronto, Canada, in May, 1911. It is a young organization, but already has more than twenty lodges in different parts of the country, and a large number of members. To lend moral support to the order and to form social centers wherever there are many operators, are the chief objects of the organization.

In the matter of increasing wages the Order of Railroad Telegraphers has been very successful. In 1886 the usual pay for an agent and operator was thirty or thirty-five dollars a month. Now, on many roads, the minimum paid to oper-

ators is fifty dollars a month, and competent men get from sixty to one hundred dollars a month. Through the efforts of the order the nine-hour law was enacted several years ago. On many lines, since then, the order has been successful in its negotiations to reduce the working day to eight hours.

The order has set high standards of efficiency for those who belong to it. They must be capable and experienced men. Membership in the order is now regarded by nearly all the railways as a certificate of ability and trustworthiness.

Must Never Make a Mistake.

If the unforeseen never came to pass on a railroad it would not be necessary that train-despatchers and the operators, towermen, and others on the line, all of whom are connected by the slender wire that parallels the tracks, should be such skilled and dependable men. If no train ever was delayed, if there were no extra trains, no accidents—if everything followed the theory of perfect railroading—the telegraph-operators would be unnecessary.

But emergencies arise every hour. Trains are delayed by many causes, and their schedule must be rearranged from moment to moment. Without the telegraph, this would be impossible. That is why the train-despatchers and the operators are so vital to railroading.

The public hears little of the train-despatcher, and knows less about him. He is a high type of railroad official who works in obscurity, but on him the safety of trains rests with the heaviest responsibility. He must never make a mistake. He knows that each message he sends must be as certain as Fate itself; that the change of a single letter or figure may produce disaster.

The despatcher comes from the ranks of telegraphers. His knowledge of railroad operation, both theoretical and practical, must be as nearly perfect as is possible. There are great telegraph-operators and great despatchers just as there are great generals or great railway presidents. It is the emergency always that tests. When all is well any despatcher can control train movements. But when storms demoralize the line, when there is a deluge of unexpected traffic, when there is a wreck or a derailment, then the sheer genius of the men at the key becomes apparent.

Train-Sheet Is Despatcher's Domain.

The despatcher is monarch of more than he surveys and is a ruler whose word is absolute. The train-sheet before him is the map of his kingdom, and his subjects are the conductors, the engineers, the signal-men, and all the rest who are concerned in moving the trains and in keeping the pathway clear for them. He is like the silent figure on the bridge of a great ship. In his mind is a picture-map which shows distinctly every mile of the line under his control, every siding, every cut and fill and bridge, and every train that is speeding over the rails.

The train-despatcher is the lord of the "power," as the railroad men call the locomotives. One who is unfamiliar with such sights, passing from the despatcher's office to the roundhouse where the great engines are stabled, finds powerful stimulant for the imagination. In the despatcher's office at night all is brilliantly lighted, there is a continuous rattle of telegraph instruments, the men who sit at the keys are intensely absorbed in their work.

In the roundhouse there is neither brilliant illumination nor much noise. The great engines arrive and depart, patient, sleepless, mighty. Some are the lean racers that dash with the limiteds; others are big and brawny freight-engines. They await the despatcher's orders, the sheets of tissue that are scanned so carefully because they are the result of every possible precaution against error and accident.

The train glides out onto the line. Warned by wire the men in the towers set the signals. The first order from the despatcher directs the train to proceed to a certain point and specifies carefully every other train, regular or extra, that it will meet, and the point where they should meet and pass. As soon as the train reaches the end of its orders, others await it, and so it proceeds to the end of the journey. Not infrequently, at some lonely way-station, it is halted by a signal, and the operator hands out orders canceling those already issued.

The ceremony of the train-order seems bewildering to the outsider, but is a sort of human interlocking system. It places the responsibility unerringly on some individual during the run. Each man knows not only what his own duties are, but the duties of the others who are also concerned. If he fails to obey he knows that disaster is probable. Therefore, for his own honor, he must be alert.

It is this interdependence that binds railroad telegraphers with such strong and intimate ties. They live in an atmosphere where names and faces count for nothing in the making of friendships, where personality is insensibly communicated by the wire. They are widely separated in a physical sense, but yet are brought into the closest touch and sympathy by an electric current.

That is why the Order of Railroad Telegraphers is one of the most effective of the great organizations. No matter where a man is located it does not take long for every one on his circuit to know him. A man puts much of his real self into his telegraph-key.

If he is in good spirits his Morse shows it. If he is dull and sluggish, the key betrays him.

The railroad telegrapher is a fine type. Nervous, quick, accurate, mentally alert, it is no wonder that so many of the prizes of the railway service have gone to those who began at the key in a lonely station far out on the line. There are at least half a score of railway presidents who have belonged to the order, and hundreds of other men high in the railroad world still maintain their connection with the organization which they entered in the early days of their careers.

RELICS OF JAMES WATT HOUSED.

AN interesting presentation was made at Manchester, England, when Mr. George Tangye presented to the corporation a unique collection of relics of Watt, the inventor of the steam-engine; Boulton, the partner of Watt, and Murdock, his ablest assistant. The collection consisted of a large number of mounted and unmounted drawings and letters dating from 1775 from the engineers named, as well as from many other leading men in the latter part of the eighteenth century. There were also a variety of models, including Watt's engine indicator, Murdock's rotary engine and pump, section of Newcomer engine, with several cases of drawing instruments. An interesting letter of Watt's addressed to the Abbé de Calonne, dated 1787, was in many ways as applicable to events transpiring to-day as when written, 124 years ago. Mr. Tangye also presented £250 toward the proper housing of the relics in a suitable room of the public library. The lord mayor presented a suitable resolution thanking Mr. Tangye for his generous gifts, and stated that the gifts were peculiarly gratifying to the citizens of Birmingham, where Boulton & Watt's works were located, and where the steam-engine first came into practical utility. It will be recalled that Mr. Tangye is a member of the distinguished engineering family whose work, especially in hydrostatic machinery, made many advances in applied science. Among the earlier operations, the launching of the Great Eastern was a notable work at the time. It became possible by a clever adaptation of the hydraulic jack, the invention of Richard Dudgeon, a Scottish mechanic, who became an eminent American engineer.—*Railway and Locomotive Engineering.*

ORIGIN OF THE WORD "ENGINE."

THE Latin word *ingenium*, which signifies heart, mind, abilities, or genius, was originally applied to any mechanical device or contrivance of an ingenious or complicated character. In the course of time the word became Anglicized into "engine," and those who operated mechanical appliances were called "engineers." Numerous machines have got their names from a corruption or abbreviation of the word *engine*, as, for instance, gin, jinny, etc., but of late years the name has been applied almost exclusively to prime movers. "Locomotive," which is now used to denote locomotive engine, was first applied in the sense now generally used through George Stephenson naming one of his first engines "locomotion." The word was expressive and convenient and soon came into popular use. Some slight deviations from the word were common in early days. The Norris Locomotive Works, when first established announced that they intended building locomotives.

On the Editorial Carpet

We Whistle for a Siding and
Ask You to Throw the Switch.

A WAY-BILL OF WORDS.

A JASPER from out Arkansaw way flew the home-coop when he reached the age of thirty in order to see what the rest of the world looked like. His means of egress was an empty freight which ultimately bumped him into Chicago. After watching the Masonic Temple revolve on its axis and lamping the other wonders of that great city, friend Jasper got a fit of the blues and decided to go back home. So he wandered to the big freight yards where the rattlers were lined up, but there were so many he couldn't tell toward which point of the compass any of the trains were heading. Seeing a friendly-looking bo hard by, he asked:

"Howdy, stranger, where can I jump a train for Arkansaw?"

"Well, foxy," replied the rambler, "there's a stringer over there: ask him, and if he can't tell you, ask that hog on the iron horse. If then you are minus the information, just mope over to the snakes by the snake house. If they refuse to tell you, ask that eagle-eye on yonder Rogers mule. If you don't find out from him spiel over to the snipes, and if—"

But the bo was talking to empty air. Jasper was beating it down the track. Suddenly a yard detective stopped him.

"Where are you going?" he asked, showing his star.

"I'm on my way to Arkansaw," said Jasper.

"Are you going to run all the way?" asked the detective.

"No," replied the innocent rube, "I'm going to catch a freight."

The other man threw back his shoulders, heaved a deep sigh and blurted out: "Do you know that I'm the bull here? Get out of these yards!"

Jasper took the shortest cut to freedom. As he reached the limits of the yards he encountered a bunch of boes eating a dry combination. He was invited to join the feast, but sore at heart he kept on his way.

"I guess you don't want anything to do with us because we're a bunch of cats," said one of the boes with a touch of feeling.

This was too much for Jasper. Turning, he replied: "Strangers, I'm from Arkansaw and back I go, for I fear my brain is impaired. I thought I was in a railroad yard, but guess I must be in a South American jungle. Before I'm taken for an elephant and shot, I'll just get out."

The reason for this perfectly harmless yarn may be found in another page of "The Carpet," under the heading "Shall We Flag It?" The final decision rests solely with you—our readers. Does the railroad-worker use slang? Does it jar your cultured mind if we print railroad slang in these pages?

If you turn to us for sympathy we can only say that slang has a place in our language. The gentry who make dictionaries dub it as inelegant and unauthorized. They claim that its use is limited to the illiterate, but in this we

beg to differ. Words are created by a people because they are needed. One age will discard many of the words of the age that preceded it and put new words in their place. In this way many new words—some of them only slang—are taken bodily into the language and recorded as first-class lexicography. In time they become useful grammatical words. Even the worthy Bill Shakespeare frequently put slang in his plays in order to emphasize a point.

So far as railroad slang is concerned, there are many words and expressions that are more elegant than otherwise. An engineer was called an "eagle eye" on the presumption that his eye is as keen as that of the king of birds. Nothing could be more complimentary.

The slang of the railroaders is picturesque. Its use lends an element of humor that would otherwise be missing; and humor creates laughter, and laughter enlarges the heart, stirs up the vital regions of the body, expands the lungs and prevents disease. Beware of the man who has no sense of mirth!

The railroaders are not alone creators and users of slang. You will hear it in the army and the navy, in law and in medicine, in the bank and on the bourse.

However, "Shall We Flag It?" That is the question? It's up to you.

We have just taken aboard a number of big things for the next year's literary way-bills. We regard the list as the biggest and best bunch of articles and stories that this magazine has had in the six years of its existence. Only a few can we mention:

The Bureau of Standards and the Railways.
The Famous Eddy Clocks.
Transportation on the Top of the World.
The Railway Business Association.
Locomotive Wheel Loads and the Mallet Type.
How Railroad Spikes Are Made.
Modern Railroad Apprentice Schools.
Electric Locomotives, Their Cost and Maintenance.
Experiences of a Chief Despatcher.
Famous Underground Railways.
Conditions for Railroad Men at Panama.
Railroad Men Who Won Carnegie Medals.
Building Operations of the Canadian Railways.
British Railways from an American Point of View.
Locomotives of Moderate Weight.
Confessions of a Hobo.
Stories of the Railroad Battles with Indians.
The Lost and Found Department.
Stories of Telegraph Operators.
With the Traveling Engineer.
The Engineer of Tests.
The Boiler Maker's Dangerous Work.
Little Fellows of the Roundhouse.
The Engine Despatcher.
The Origin of "Bradshaw."
Why the States Regulate Railways.
Old-Timer Stories.
Tales of the Roundhouse.
True Stories.
Famous Train Robbers.

These are only a few of the subjects. Last July we tried the experiment of making the RAILROAD MAN'S MAGAZINE a bigger, better, more valuable publication, and we raised the price to 15 cents a copy. Seventy-five per cent of the letters we receive contain the statement that the writer would gladly pay double the present price and buy the magazine twice a month.

But we do not intend to increase the price again. We do intend, however, to improve the magazine more and more, and your critical observation of its contents will always be a help to that end.

EYES FRONT!

WE wish ever to be cheerful when we get together with our big family in "The Carpet." We shall always endeavor to make optimism the key-note of our opinions, for we have unbounded faith in the world and in men. We believe in the ultimate triumph of truth, justice, and humanity. We are young in our civilization, but men and women are ringing truer to the specie than ever before.

Therefore, we beseech you never to swerve from the belief that, no matter what may fill the day, we are getting on. Life has its tragic

elements—its railroad wrecks, its Titanic disasters, but out of all these things, good will come

Man's fight for life, liberty, and happiness has always meant struggle and death. Most of our lessons have been horrible, but we had to have them that we might emerge from ignorance into the full clear light of intelligence. Each catastrophe prints its lesson indelibly on some minds, and the idea once created gathers mighty force and works for betterment.

No matter what befall, there is some good in it. The world cannot go backward; man has become too intelligent and too human. He has glimpsed some of the things that may be, and it is the struggle to realize these things that creates the problems that make life worth living.

JUSTICE TO PRESIDENT W. S. CARTER.

IN the history of the Brotherhood of Locomotive Firemen and Enginemen, which appeared in the August number, we stated that at the twelfth biennial convention in St. Paul, in June, 1910, Mr. A. W. Hawley was elected grand president of the order. This was an error, and we wish to make this apology to Mr. W. S. Carter, for Mr. Carter and not Mr. Hawley is the chief of the brotherhood. Mr. Hawley is the grand secretary and treasurer.

Mr. Carter was chosen president by the Columbus convention, in 1908, and since that time the brotherhood has enjoyed a period of unsurpassed prosperity. This correction is made to give Mr. Carter his place as the efficient leader of a most worthy organization

The omission was extremely regrettable. Inadvertently we neglected to do full justice to Mr. Carter's able administration of the brotherhood's affairs. His election four years ago marked the inception of a period of remarkable growth and success.

In 1908 the Brotherhood of Locomotive Firemen and Enginemen had 66,408 members On June 30, 1912, there were 82,993 members, a gain of 16,585. In 1909 the insurance department paid $758,749, not $1,110,750 as we stated. In 1910 the insurance department paid $913,641.24; in 1911, $932,922.76. In 1912, to June 30, this department paid $475,231.75. In 1908 the Columbus convention paid to members whose claims did not come within the law, $124,000. In 1910 the St. Paul convention delegated to the board of directors the authority to pass upon such claims as did not come within the law, and this class of members received at the convention and during the remainder of the year 1910, $134,000; in 1911, $19,500; in 1912, to June 30, $25,000.

On June 1, 1908, there was in the grand lodge treasury, $739,568.68. On June 30, 1912, the insurance fund amounted to $1,592,439.57. The grand lodge treasury totaled $2,367,165.87, a gain of $1,627,597.19 in four years.

Through the protective department, which has to do with labor, the firemen on nearly all Western railways in the United States and Canada have secured substantial increases in pay and better working conditions during the past four years. The firemen in the East are to follow the engineers with a request for increases in wage and better working conditions. A conference will take place as soon as negotiations with the engineers are concluded.

Much of this success is due directly to the progressiveness and energy of Mr. Carter—progressiveness and energy that should be adequately appreciated

WORTH A SECOND THOUGHT.

MR. L. HADRA, of Dallas, Texas, makes a suggestion which seems to merit the consideration of railroad companies and railroad workers. Mr. Hadra thinks that it would protect both the passenger and the employee if the companies were to equip all trains with emergency cases for use in the event of accidents and consequent injuries

In a letter to us Mr. Hadra says that most of our railroad accidents occur where it is very difficult to secure speedy medical attention, and this loss of time very often makes serious injuries of those which, if given prompt first aid, might not result gravely

The emergency case need not be so elaborately equipped that it would entail enormous expense. A sufficient supply of cotton, bandages, washes, and lotions for dressing wounds is all that is necessary.

We gladly commend Mr. Hadra's suggestion to the attention of railroad surgeons.

RECENT BOOKS.

IN "Running a Modern Locomotive" and "Easy Steps to Locomotive Engineering," Frederick J. Prior offers to the younger railroad men two very acceptable books. They are educational in their purpose and might be considered by railroad students as companion volumes.

"Running a Locomotive" is intended to prepare the student fireman for the examinations which he is required to take at the completion of the first and second year of his service. The text is presented in the form of questions and answers, and covers the subjects thoroughly.

In "Easy Steps to Locomotive Engineering," the author has a number of interesting chapters on the locomotive, its construction and operation, fuel and combustion, steam, and

other phases of the eagle-eye's work. The reader is enabled to test his knowledge of the book by the questions which accompany the various subjects. Both of these volumes take their places among the technical books on railroading.

"Easy Steps to Locomotive Engineers," $2 "Running a Modern Locomotive," $1.50, by Frederick J. Prior, Truth Publishing Company, Chicago.

IT should interest our readers to learn that H. Antoine D'Arcy, author of the "Face on the Barroom Floor," has issued a volume of his verse under the correct title of his famous poem, "The Face Upon the Floor." To this well-known poem, which has always been a favorite with our readers, he gives first place and states that its popularity impelled him to devote some of his time to riming. There are about fifty poems in the little volume, and though none of them are of the railroad, the tone of "The Face on the Barroom Floor" seems to ring in many of them.

"The Face Upon the Floor and Other Ballads," by H. Antoine D'Arcy, Lubin Manufacturing Company, Philadelphia, 25 cents.

SHALL WE FLAG IT?

EDITOR, RAILROAD MAN'S MAGAZINE

"I HAVE been a reader of your magazine for three years and think it the best. I differ with T. R. E., in the August issue, in regard to H. A. Harris and his so-called junk T. R. E. must have got his experience on a "merry-go-round" scenic railway or in some other way than on a standard-gage railroad. There are two classes of railroad men: home guards or stickers and boomers or floaters. The second class is responsible for most all the slang and railroad terms which only a man of experience can understand.

I for one like slang and can see no harm in it, and to use it in the RAILROAD MAN'S MAGAZINE is just what every railroad man wants, unless he is one who sees the dark side of life and never the bright side—L. M., Akron, Ohio.

EDITOR, RAILROAD MAN'S MAGAZINE:

I HAVE just read the letter signed T. R. E., Long Beach California, and in my opinion the writer seems more like a "would-be" railroader than a "has-been." I happen to be a switchman's wife, and he never "runs light" when it comes to railroad slang.

I think "Flagging Easy Money" one of the most interesting stories published in this magazine, and I suggest that we give Mr. Horris a "clearance card."

I don't say railroad men talk nothing but slang, for when they "do" society, you can't tell even a switchman from anybody else; but when "old-timers" line up—well, you simply have to be a railroader to appreciate their talk.—MRS. A. El Paso, Texas.

EDITOR, RAILROAD MAN'S MAGAZINE:

I THINK that the gentleman signing T. R E., who wrote you the communication which you headed "Shall We Flag It?" has hit the nail very squarely on the head. For seven years I have associated with railroad men in all branches of the service, and the only ones whom I have heard use slang were kids just on their first job and boomers.

As you have printed in your pages many times the true statement that railroad men are as gentlemanly in speech and manners as are men employed in other vocations, why not put into their mouths such words as they actually do use among themselves instead of an argot which tends to create a false impression of these men among the many non-railroad readers of this magazine? Why not? I am sure we would all appreciate it.

And I think that you have already made a start in the right direction. The general tone of the magazine has vastly improved in the last year or so, and if this continues, you will worthily represent the vast army of railroad men and become as much of an institution among them as are their various organizations —A. H. H., Oakland, California.

TEMPORARILY SIDE-TRACKED.

BECAUSE every car on our limited was crowded to its capacity this month, we were obliged to leave in the editorial yards of the brainery terminal the second instalment of "Famous Train Robbers" containing the life-story of Black Bart the "Po-8." It will be hitched to the November flier next to the engine

ANOTHER DOUBLE STACKER.

EDITOR, RAILROAD MAN'S MAGAZINE.

I NOTICED in your August number that you mentioned and published an illustration of a locomotive with a double smoke-stack. Taking it for granted that this was the only one you had ever heard of, I am taking the liberty of calling your attention to the fact that either in 1899 or 1900 the Texas Central Railway Company, whose shops at that time were at Walnut Springs, turned out at least one double smoke-stack engine. I saw this engine in Waco, their Southern terminal.—C. E. R., Beaumont, Texas.

WHERE THE TRACKS ARE NAMED.

EDITOR, RAILROAD MAN'S MAGAZINE:

THE Chicago, Milwaukee and St Paul Railway has a yard in Minneapolis known as the Upper Yard, where the tracks, instead of being numbered, as is customary, are named.

Following is a list of the tracks that have monnikers. The lead is known as the coach lead:

Tank, Hole, Second Lumber, First Lumber, Scale, Dean's, Long's, Supply, Repair, Extra Side, House, Old Scale, New Boiler, Old Boiler, Extra Horn, Horn, Railway, Pratt's, Armour's, Shipping House, Old Lead.—J. T. D., Minneapolis, Minnesota.

GARRICK H. HAVERLY'S FEAT.

IN connection with your interesting article in your September number on the Railway Mail Service, I beg to send you the following:

On February 28, 1898, Garrick H. Haverly, a clerk on the Q. and C., between Cincinnati and Chattanooga, entered the office of the chief examiner at Cincinnati and asked if he could volunteer to "stick" a few cards. Being told that he could, he began on the State of Georgia by routes, then took up Indiana, Tennessee, and Kentucky.

He sat at the examination cases steadily from 9 A.M. till 3.22 P.M., handling 10,205 cards with 79 errors, averaging 28 cards per minute, with a percentage correct of 99.22.

This feat was the talk of the entire service at the time and has never been equaled since. Mr. Haverly is out of the service now, having had to retire on account of injuries received in four different collisions. Whenever I see anything in regard to the R. M. S. I always think of his remarkable feat and the distressing circumstances under which he is now laboring.—C. W. H., Birmingham, Alabama.

STRAIGHT NUMBER CARS.

EDITOR, RAILROAD MAN'S MAGAZINE:

RECENTLY, in the east-bound yard of the Michigan Central Railroad, I saw Boston and Maine flat car, No. 33333. It was loaded with car-wheels.—J. G. H., Jackson, Michigan.

EDITOR, RAILROAD MAN'S MAGAZINE:

IT may interest your readers, and especially J. S., Liberty, Indiana, who writes in the August RAILROAD MAN'S MAGAZINE, that he saw C., H. and D. box car 11111 pass through Liberty, east bound on local, May 25, 1912, to know that I was conductor on C., H. and D. train running between Cincinnati and Lima, Ohio

On train second 94, June 3, 1912, I had on my train out of Cincinnati Central of Georgia 2222 loaded with lumber for Deshler, Ohio, routed east from Deshler *via* the Nickel Plate. At Hamilton, Ohio, I picked up M. and St. L. car 8888 loaded with lumber for Dayton, Ohio—routed east from Dayton *via* Erie. I also picked up C., H. and D., 11111 loaded with merchandise for Lima, Ohio.

At Kirkwood, Ohio, I took siding to meet a train, and as my engineer started out of the siding the draw-bar came out of C., H. and D. 11111. I placed this car in the rear of the train, chained it to the caboose, and took it to Lima for repairs.

Later I saw it on the repair-track at Lima. From its appearance it looked as if it had traveled its last miles. It was a very old car.—V. O. D., Cincinnati, Ohio.

RESTING PLACE OF THE "TEXAS."

EDITOR, RAILROAD MAN'S MAGAZINE:

IN the July number you made a mistake when you said that the locomotive "Texas" rests peacefully in San Antonio, Texas. I would be glad if you would correct it. The "Texas" is in Atlanta, Georgia, on the hill of the Confederate Yard, enclosed with a fence with some cannon used in the war.

As well as I can remember, the "Texas" was in use until recently on a lumber track up on the W. and A. road, now leased to the N. C. and St. L. After being completely worn out, it was replaced by another engine, and after standing on a siding for some time it was sent to the scrap.—H. C. C., Atlanta, Georgia

THE OLDEST TICKET.

EDITOR, RAILROAD MAN'S MAGAZINE:

I THINK I have your old-ticket fiends beaten to a frazzle. I have a ticket issued by the old Eastern Railroad in 1855.—J. G. B., Somerville, Massachusetts.

THE POET'S CORNER.

NEVER.

I'VE never been a railroad man nor pulled a Johnson bar,
I've never handled diamonds nor have I switched a car,
I've never took a flimsy, I've never swung a lamp,
"High-balled" freight or passenger, never been a tramp,
Never wiped an engine or put it on the spot,
Never rode the right side or was a tallow-pot.
Never coupled freight-cars nor rode one in a ditch,
Never pumped a hand-car, never threw a switch,
Never worked on sections, never tamped a tie,
Never rode a passenger that worked out of a wye.
Never worked on bridges, never worked a key,
Never handled baggage, for that's too much for me,
Never dropped the red-board nor pulled one up on high,
Never failed to stop and look whene'er a train went by.
Never flagged a crossing nor worked the crossing gate,

Never worked on platforms, never did truck freight,
Never worked in roundhouse, in office, or in yard,
Never put a seal on and never marked a card
Never saw a railroad man but what I liked his style,
And never have I found one without his sunny smile
I thought I'd like to know them, but did not know the way,
But the RAILROAD MAN'S MAGAZINE I chanced to see one day.
I picked it up and read it through—its smiles, its thrills, its tears,
And I haven't missed a copy in nearly seven years.
Every month I read it through, the stories one and all—
Well, I must leave you now, old pal—I've got the board, HY. BALL.

"TICKETS!"

BY E. A. BOYDEN.

THE stars looked cold from the wintry sky
On the "Fast Express" as it thundered by
With unchecked speed a modest station,
Where they sometimes "flag" the "Accommodation."
Light and warmth and comfort within
Peeped through the frosty windows so thin;
Jokes and laughter, mirth and smiles,
Kept time to the clink of the train for miles.

Manhood's strength, and the tender and fair,
And childhood's innocence, all were there;
But one sad face in the corner sat,
Half concealed by an old slouch hat;
With an ague he shook as the door flew wide,
And the brisk conductor came in with a stride;
With a pallid face and teeth firm set
The pitiful eye the pitiless met.

"Tickets!" The ticketless man was dumb;
Laconic his summons were—simply, "Come";
And the rope was pulled that checked the speed
Of the train that thumped 'gainst the iron steed.
"Who is he?" was asked, as they hustled him out;
"Oh! a tramp, I suppose—no doubt, no doubt."
So they pushed him off the platform there,
And left him to grope in the cold night air.

Then the train rushed on with its clinkety-clink
And no one missed the sad face, I think,
For the mirth went on and laughter was loud,
And it seemed a happy, contented crowd.
With the frightful speed the coaches are tossed,
For the engineer must gain what he'd lost;
And the engine quivered as tho' in distress,
She must be on time—'tis the "Fast Express."

And the stars look cold from the wintry sky
On the man who crawled to that station to die;
He is "flagging" a train on another line,
'Tis a "through" one, they know by his look and sign.
'Tis the last we take for the Great and Sublime;
It is fleet as the winds, and always on time;
Though a fantom train, none need be appalled,
Nor tremble, if ready when "Tickets" are called.

THE ENGINE-DRIVER TO HIS ENGINE.

BY W. J. M. R.

PUT forth your force, my iron horse, with limbs that never tire!
The best of oil shall feed your joints, and the best of coal your fire.
So off we tear from Euston Square, to beat the swift south wind.
As we rattle along the North-West rail, with the special train behind.

Dash along, crash along, sixty miles an hour!
Right through old England flee;
For I am bound to see my love,
Far away in the North Countrie.

Like a train of ghosts the telegraph-posts go wildly trooping by,
While one by one the milestones run and off behind us fly,
Like foaming wine it fires my blood to see your lightning speed,
Arabia's race, ne'er matched your pace, my gallant steam-borne steed.

Wheel along, squeal along, sixty miles an hour!
Right through old England flee!
For I am bound to see my love,
Far away in the North Countrie.

My blessing on George Stephenson! let his fame forever last;
For he was the man that found the plan to make you run so fast;
His arm was strong, his head was long, he knew not guile nor fear;
When I think of him, it makes me proud that I am an engineer.

Tear along, flare along, sixty miles an hour!
Right through old England flee!
For I am bound to see my love,
Far away in the North Countrie.

Now Thames and Trent are far behind and evening's shades are come;
Before my eyes the brown hills rise that guard my true love's home;
Even now she stands, my own dear lass! beside the cottage door,
And she listens for the whistle shrill, and the blast-pipe's rattling roar

Roll along, bowl along, sixty miles an hour!
Right through old England flee!
For I am bound to see my love,
At home in the North Countrie.

—*Blackwood's Magazine.*

Summer-time always on tap!

Papas and mammas worry a lot more than they need, at the approach of the raw, bleak days of Winter. If they would arrange now to have *summer-time always on tap* in their home, it would save much nervousness over threatened colds, sore throat, croup, diphtheria and other troubles that almost all come to their little folks from catching cold first—in drafty rooms or on cold floors.

AMERICAN RADIATORS & IDEAL BOILERS

will make homey-like any kind of a house or building—not too hot or cold at all—but just right—just as we all want it—uniform temperature all the day long, and night, too—flooding the house with Summer temperature at the turn of a valve.

With an outfit of IDEAL Boiler and AMERICAN Radiators the coal-bills grow smaller; uneven heating and repair bills disappear, ashes, soot and coal-gases are unknown in the living-rooms; housework and cleaning are reduced one-half, and the whole house is made a far better, happier, healthier place to live in and work in. The phenomenal success of IDEAL Boilers and AMERICAN Radiators is also largely due to the fact that they are made in sections so that even their largest parts can be carried through an ordinary sized doorway.

The necessary piping and AMERICAN Radiators are set in place without tearing up partitions or floors, or disturbing occupants, and the IDEAL Boiler is quickly erected and connected up without the necessity of removing the old-fashioned heating devices until ready to start fire in the new heating outfit. For this reason IDEAL Boilers and AMERICAN Radiators can be quickly installed in Winter weather when the old, crude heaters get badly worn or collapse. If you are weary and discouraged with the everlasting blacking, repairing, fire-coaxing, scuttle-heaving, etc., discard the old-fashioned heating and begin at once the safe, sanitary, reliable way of heating by IDEAL Boilers and AMERICAN Radiators. Write us to-day for booklet (FREE): "Ideal Heating."

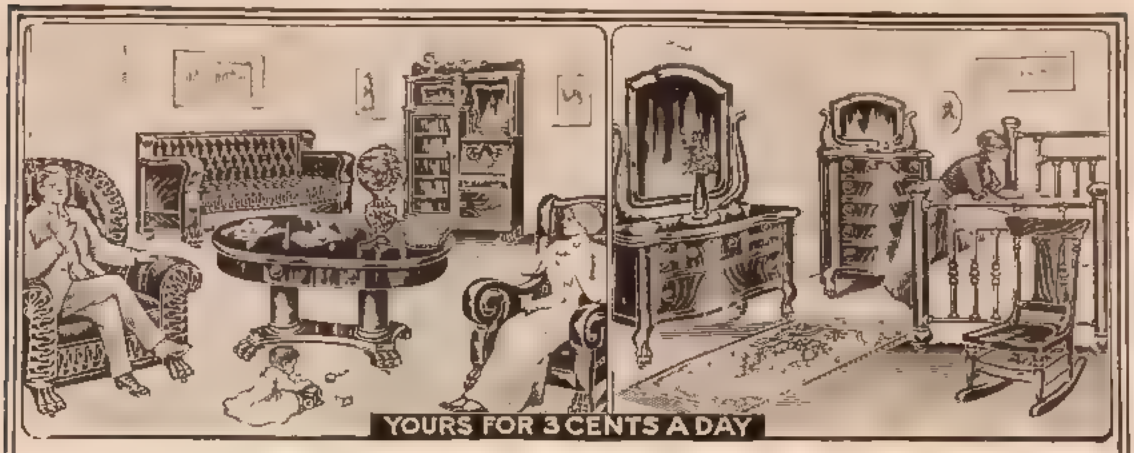
A No. 2-22-W IDEAL Boiler and 456 sq. ft. of 38-in. AMERICAN Radiators costing when $220, were used to heat this cottage. All these radiator goods can be bought of any reputable, competent Fitter. This includes cost of labor, pipe, valves, freight, etc., which are extra and vary according to climatic and other conditions.

Write us also for catalogue of ARCO WAND Vacuum Cleaner, that sets in cellar and is connected by iron suction pipes to rooms above. It is the first genuinely practical machine put on the market, and will last as long as the building.

Showrooms in all large cities

AMERICAN RADIATOR COMPANY

Write Department J
816-822 S Michigan Avenue, Chicago



Good for One Dollar

Here is an offer which means a dollar to you, if you simply write at once.

Simply send us the coupon for the splendid Fall Issue of our Home Lovers' Bargain Book

The book is entirely free. It is a mammoth book, picturing 4,528 of our latest bargains in everything for the home.

Many of the pictures are in actual colors—all are big and clear. They show all the new ideas in

Furniture	**Silverware**
Stoves	**Chinaware**
Carpets	**Kitchen Cabinets**
Rugs	**Sewing Machines**
Draperies	**Washing Machines**
Lamps	**Baby Cabs, etc.**

Here are thousands of such things, in every style, shown in a single book.

We want you to see it before you do any fall buying, so we make this remarkable offer.

Write for the book before October 1, and we will send with it a Dollar Certificate.

It will be good as the cash for $1 as part of the first payment on any order for $20 or over.

It will be good for 50 cents as part of the first payment on any $10 to $19.99 order.

We will pay this much toward anything you buy, just to get a prompt reply.

But this offer is only for immediate inquiries. It will never be made again.

All the Best Things in Life Yours for 3 Cents a Day

Long-Time Credit

We sell all these things on a new kind of credit—on open charge account

There is no interest, no security, no red tape or publicity. We trust home lovers, poor or rich, for anything they need.

We send things on 30 days' trial. You may keep them a month before deciding to buy. Anything not wanted may be returned, and we pay freight both ways.

What you keep can be paid for a little each month, at the rate of a few cents per day. The average customer takes a year to pay.

We have furnished in this way over a million homes. Many of those homes had very small incomes. But they have beautiful things, just because we let them pay in this easy way.

You are welcome to the same arrangement.

Save Up to 50 Per Cent

Our prices run from 30 to 50 per cent below store prices. This is proved by actual comparison made in 20 cities. We save you this by buying in large lots. We get the overstocks. We buy when makers must have cash.

We buy more furnishings than a thousand retail stores combined. And we sell direct. We sell on credit exactly as low as for cash. Thus we guarantee to save you 40 per cent, or let any other house in America. Were the saving doesn't suit you, goods can be returned.

SPIEGEL, MAY, STERN CO.
1164 W. 35th Street, Chicago

Mail me without charge your

- ☐ Fall Bargain Book.
- ☐ Fall Stove Catalog.
- ☐ Fall Jewelry Book.

Also the Dollar Certificate.

Name .....

Street .....

Town .....

State .....

Spiegel, May, Stern Co

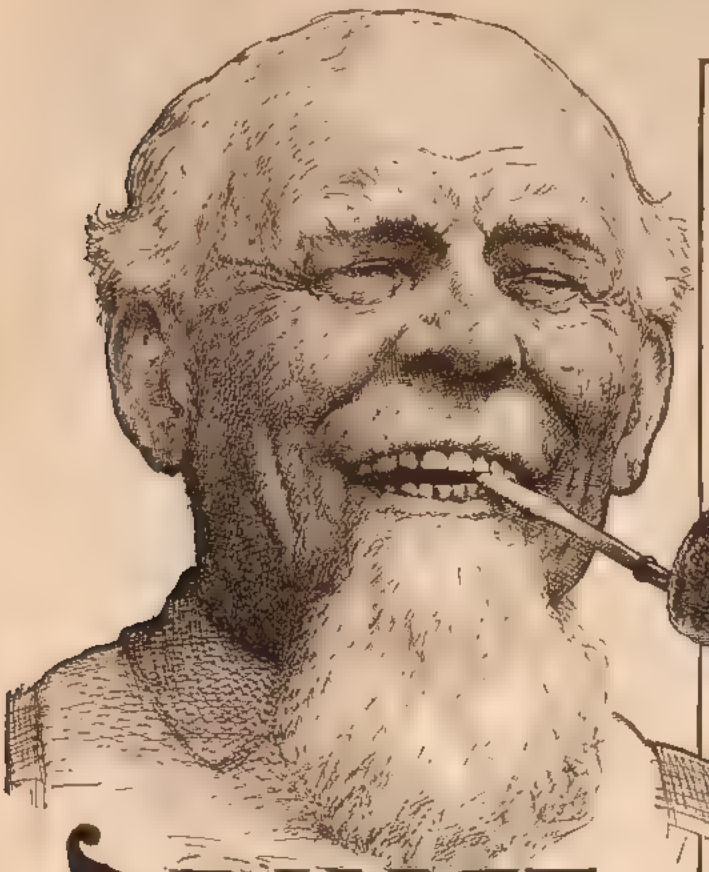
1164 W. 35th Street, Chicago

Send This Coupon Before October 1

To get the Dollar Certificate you must mail this coupon before October 1. Send it today.

This mammoth Home Lovers' Bargain Book will then be mailed free to you, with its 4,528 pictures. Also the Dollar Certificate. You will be astonished at the prices quoted on pretty things you want.

(241)



PRINCE ALBERT

the national joy smoke

Tender tongues

catch the hobnob habit with Prince Albert tobacco on the first fire-up, just as little ducks go to water, *natural like!*

It's this way: Prince Albert won't sting tongues, because the sting's *cut out* by the patented process that has revolutionized pipe tobacco.

With P. A. jammed in the bowl, you and every other man can smoke a pipe all you want and your tongue *won't even tingle!*

Just you figure out the joy of getting real fun out of a jimmy pipe and forget that old idea that pipe tobacco can't be free from the bite. It sure can, because P. A. knocked that galley-west two years ago. *It's the one pipe* tobacco that you can bet a house and lot on today, next week, next year!

Oh, stop a-wishing about it! Go to it!

And listen, P. A. makes the best cigarette you ever rolled. Fresh, sweet, delicious—as bully good as in a pipe! And that's trotting *some!*

Buy Prince Albert everywhere—St. Paul, New York, Tampa, Winnipeg, Seattle, Five Corners, Kankakee—it's just the same glorious smoke. In 5c toppy red bags; 10c tidy red tins; handsome pound and half-pound humidors.

R. J. REYNOLDS TOBACCO CO.
Winston-Salem, N. C.

Pipeology

Here's a popular pipe—a corncob fitted with a wooden stem and a bone mouth bit. It's just a little niftier than the ordinary corncob, but costs no more. It imparts the same satisfaction to the smoker.

You Can Make $22.50 Every Day

THAT MEANS ONLY THREE SALES DAILY

AGENTS

Here's the Cleaner You've Been Waiting for—Best, Simplest, Easiest Seller

The Only Successful Hand Power Machine

The demand for Vacuum Cleaners is already here—it's only a question of who meets it best. The FEENY solves the problem of price, simplicity, light weight, perfect efficiency. The only moderate priced, one-person, hand power machine that does the work quickly, easily, thoroughly, getting even better results by actual tests than the higher priced power cleaners. So simple that a ten year old girl can operate it; nothing to get out of order, no wires to attach, no cumbersome hose to drag around; no power bills to pay; always ready for instant use; nothing else can compare with it.

100 Per Cent Profit On Every Sale

Every home needs a FEENY Vacuum Cleaner. Every woman wants one when she sees it work. No experience necessary—just step in anywhere and demonstrate. Explain the new and original principle of utilizing air by hand power—show how the powerful suction is produced by [illegible] of the right arm while [illegible] stationary with left hand—no stooping—no straining of muscles—no drudgery or hard work. Sales follow quick and easy. And remember, you make a profit of 100%. One sale a day nets you $7.50, two sales $15.00, three sales $22.50 per day. Where can you get such pay? Considering competition—you can beat them all—the "FEENY" sweeps away all opposition—you can control the cleaner business of your territory.

PROOF Our territory agents are coining money because every family wants the Feeny. One agent's [illegible] in March, April and May [illegible] contract for 912 machines. Another sold 119 Feeny machines in [illegible] 25 hours. Another sold 5 in one home in another 25 in 7 days. Wonderful results sent on request.

Exclusive Territory To Live Agents

We have openings for Agents, Salesmen, Managers, to take orders for the Wonderful New FEENY Vacuum Cleaner. Any ambitious person can earn from $60 to $125 a week to start. Special inducements to live Agents, who are willing to devote their time to the business. Have also openings for men desiring to establish High grade Sub-agencies. Exclusive territory and attractive sub-agents' proposition. Big money easy to make. Free sample to workers. Don't waste time on other lines, but devote your entire time to the FEENY and make big money daily every day. *Write today for particulars.*

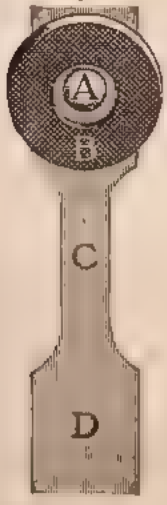
THE FEENY MANUFACTURING COMPANY, Dept. 22, Muncie, Indiana.

Do Not Putter With a Corn

Don't pare it, for paring often causes infection. And it merely takes off the top layer.

Don't use petty, unscientific treatments. Such things bring only brief relief, and the corn goes on forever.

The modern way is Blue-jay. It is used today on a million corns a month.



It stops the pain instantly. Then a wonderful wax—the B & B wax—gently undermines the corn.

Within 43 hours the corn lifts out, without any pain or soreness.

This invention gives a way to end the corn forever—a simple, scientific way. *Go now and get it.* It is foolish to have corns.

A in the picture is the soft B & B wax. It loosens the corn.
B protects the corn, stopping the pain at once.
C wraps around the toe. It is narrowed to be comfortable.
D is rubber adhesive to fasten the plaster on.

Blue-jay Corn Plasters

Sold by Druggists—15c and 25c per package

Sample Mailed Free. Also Blue-jay Bunion Plasters.

(249) **Bauer & Black, Chicago and New York, Makers of Surgical Dressings, etc.**

We Will Sell To You ON CREDIT

30 Days Free Examination In Your Own Home

Easy Terms One Year To Pay

Send for Our Free Big Catalog Today

Investigate this great money-saving and easy monthly payment plan

Learn how you can have a home of luxury and comfort immediately, for which you can pay just a little at a time, as you earn the money during a whole year or over.

You do not need to skimp and save up ten, twenty-five, fifty or a couple of hundred dollars before you buy.

You are not asked to give a note, chattel mortgage or any other security. We send no collectors—charge no interest, there is no publicity—no red tape or delay of any kind.

You take no risk. If you are not absolutely pleased after thirty days, simply send the shipment back to us and your money will be refunded, including all freight charges, etc.—so you cannot lose a single penny.

You may order any item in this special announcement, and the same way from the catalogue by simply sending first small payment. Our new, liberal confidential credit plan is just the same kind of credit your grocer or meat man might allow you, only we give you a year or over to pay—a little at a time as you find it convenient.

Our multi-million dollar resources (all our own capital—we do not do business on borrowed money) give us such tremendous buying and trusting power that we can offer you terms no ordinary concern would even dare think of. In fact, we have listed practically every item in this wonderful catalogue *at prices far below what your local dealer could even buy them for.*

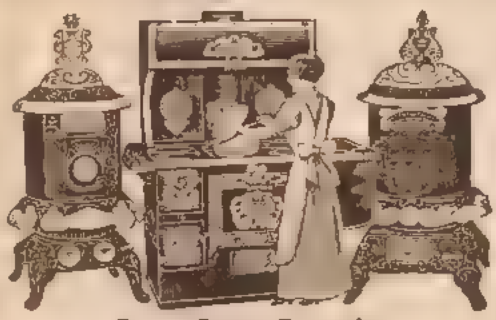
No. 0-387 Price Only $9.75

3-Piece Mission Library Set

This is a set of the highest grade in every particular—and of exquisitely beautiful design. Strongly made of solid gum, finished fumed Early English or Fumed Oak. A real mission design with rich carving on front of seat and top back panel. Has heavy posts and wide arms. Broad comfortable seats contain Monarch indestructible steel spring construction and are covered with Imperial pantasote leather. Library table has top, size 34x24 inches, broad gooseshelf about legs and end magazine racks.

Price of Set Complete, only $9.75
Terms: $1.00 down and 80c a month

30 Days' Free Examination—One Year to Pay



Great Stove Bargains.

We are with [illegible] stoves and ranges. You cannot find anywhere else such a wide variety to choose from as you will find in our new [illegible] And we offer them at [illegible] prices. Besides our [illegible] we allow you a [illegible] on your purchase. We ship promptly on approval. You pay a [illegible] of from 15 to 50 per cent to any stove you want. We guarantee to duplicate the biggest stove values in the history of our business, and you should not think of buying a stove before studying the wonderful bargains we show in our new free catalogue.

No. O-8042

This famous "Regent" Heater is listed above [illegible] It is [illegible] heating [illegible] consumption of [illegible] Has [illegible] Price [illegible] Terms 50c down and 50c per mo.

No. O-8B125

"Peerless Steel "Regent" Range with a [illegible] of only [illegible] absolutely guaranteed. Has 18x18 in. Beautifully nickel trimmed high closet. Large [illegible] [illegible] Price [illegible] Terms $3 down and $1.25 per mo.

No. O-8C203

Our famous "Regent" Hot Blast Stove is a powerful, quick heater, made of handsomely designed heavy cast iron and cold rolled steel. Has [illegible] door, is beautifully nickeled. Has hot blast tube and draft [illegible] a wonderful fuel saver. Fully guaranteed in every particular. 18 in. Firepot.

Price only **$9.85.**
Terms, $1.00 down, and 75c per mo.

Through 57 years of dealing with the public, we have proved what we believed at the beginning—that no matter where a family may live, or how small their income might be, they are just as honest and we can just as safely trust them for home furnishings as we can trust the people of greater means who have charge accounts with us in our 22 great retail stores in the big cities. Just write for our new catalogue and we will open an account for you, so that you can order anything you want—and all you want to furnish your home—and you will be given a whole year or over to pay. Remember, there are over a million families—rich and poor—who buy all of their home furnishings from us on this great, easy-payment plan.

We have prepared this Great New Catalogue, representing 7,000 modern designs in articles of furniture and home furnishings, and we will send this new book showing illustrations in natural colors, with complete descriptions, by mail, postpaid in a plain package, if you will simply send us your name and address on a postal card right now so that you can secure a copy before the edition is exhausted.

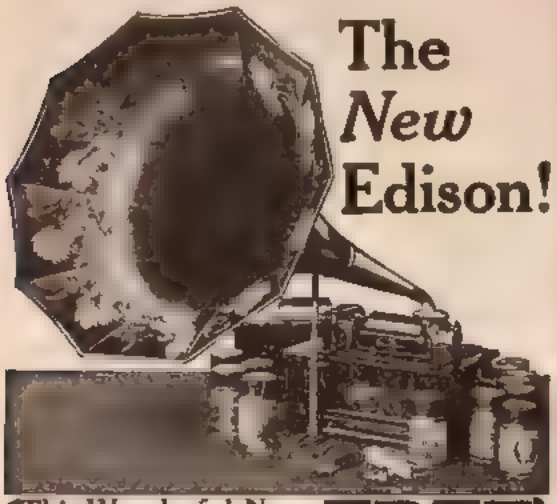
Write Today

Take advantage of this great saving in money and the convenience of our liberal easy payment credit plan. For [illegible] you can investigate and fully satisfy yourself. Send just your name and address on a postal card and we will mail you this big book of 7,000 bargains. The book will be sent in a plain package, and all charges prepaid.

It Is Free, Send Today.

This Big New Catalogue FREE

HARTMAN FURNITURE & CARPET CO.
3922 Wentworth Ave., Chicago, Ill.



The *New* Edison!

This Wonderful New Style Edison shipped FREE

Yes, you may have this wonderful new outfit or **your choice of many others** shipped *absolutely* and *positively* **free** as per offer below.

Mr. Edison Says:

"I Want to See a Phonograph in Every American Home"

For the phonograph is Mr. Edison's pet and hobby, and he knows of what immense value it is to have this wonderful entertainer in the home with its variety of selections for young and old who gather in the evening

The Edison Offer

We'll send you the New Model Edison phonograph and your choice of all the Amberol records on an absolutely free loan—no obligations, no deposit, no guarantee nor C. O. D. to us whatever. We want you to have all the **waltzes, two-steps, vaudevilles, minstrels, grand operas, also the sacred music, etc.,** of the great artists [illegible] when you are through with the outfit send it back to us.

Our Reason

We are tremendously proud of this new instrument. When *you* get it in your home we *know* everybody will say that nothing like it has ever been heard—so wonderful, so grand, so beautiful, such a king of entertainers—so we are sure that at least some one—if not you, then somebody else, will want to buy one of these new style Edisons to get it they are being offered now at [illegible] **rock-bottom price** and [illegible] **$2.00 a month.** Perhaps you yourself will be glad to keep the outfit. But even if not, you'll be glad anyway that we sent you the new Edison on the free loan—for that is our way of *advertising* quickly the Edison Phonograph.

Get the New Edison Catalog

We will send you [illegible] about this wonderful [illegible] your name and address in the [illegible] Edison Phonograph Catalog.

FREE COUPON

Edison Phonograph Distributers

F. K. Babson, Vice Pres. & Mgr.

1107 Edison Block, Chicago, Ill.

Gentlemen: Without [illegible] your great Edison Catalog, and [illegible] your special offer on my choice of a new style Edison Phonograph.

My Name ..

My Address

Edison Phonograph Distributers

Address F. K. BABSON

Vice Pres. & Mgr.

Edison Block, Chicago

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Montreal, Can.

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$10 A DAY

And Your Suit

YOU can easily make big money with our new co-operative plan, showing our wool samples and snappy fashions to your friends. It's **new.** They'll buy on sight, for you save them from $4 to $8, give them the latest striking city fashions and the finest tailoring in the world.

Your Own Suit for Nothing

by making enough on the first two or three orders to pay for it. Why not dress swell, get your clothes at a confidential, inside figure and easily make from $5 to $10 a day? *No money or experience needed.* Agent's complete outfit sent **FREE**—90 rich woolen samples—perfect measuring system—full instructions—every thing you need to start. Write today sure. *Remember*

Get This Suit

We Pay Express Charges

and take all the risk. Everything sent subject to examination and approval before payment is made. Clothes must fit and satisfy or your money back. *Send no money*—we trust everything **FREE.** Just mail a postal today and [illegible] will be [illegible] your way. We [illegible] territory now, so write quick and be the lucky man to get in on the big money.

RELIABLE TAILORING COMPANY

965 W. Jackson Blvd., Chicago, Ill.

IGNORANCE of the laws of self and sex will not excuse infraction of Nature's decree. The knowledge vital to

A Happy Marriage

has been collected from the experience of the ages, in

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It contains in one volume
Knowledge a Young Man Should Have
Knowledge a Young Husband Should Have
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Knowledge a Father Should Impart to His Son
Medical Knowledge a Husband Should Have
Knowledge a Young Woman Should Have.
Knowledge a Young Wife Should Have
Knowledge a Mother Should Have
Knowledge a Mother Should Impart to Her Daughter.
Medical Knowledge a Wife Should Have

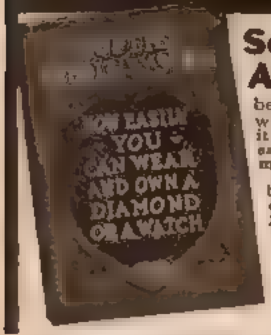
"Sexology" is endorsed and is in the [illegible] leads of our government and the most eminent physicians, preachers, professors and lawyers throughout the country

All in one volume, illustrated, $2, postpaid.

Write for "Other People's Opinions" and Table of Contents.

Puritan Pub. Co., 762 Perry Bldg., Phila., Pa.

DIAMONDS - WATCHES ON CREDIT



Send for These Two Books—They Are Absolutely FREE!

Write for our handsome free catalog. It contains over two thousand (2 000) beautiful illustrations of diamonds watches, solid gold jewelry, silverware and novelties at bargain prices. Select any article desired have it sent to your own home or express office—all charges prepaid. If it is entirely satisfactory, send one-fifth the purchase price and keep it, balance in eight equal monthly amounts. We are offering great bargains in ladies' and men's watches.

Our Blue Book, which tells "How Easy You Can Wear a Diamond or Watch by the Loftis System," answers every question that a person could ask about our liberal credit plan or concerning the purchase of diamonds, watches and jewelry on credit. It is beautifully embossed in blue and gold and is worth its weight in gold to anyone interested in our line.

Both of these books will be sent to you **absolutely free upon request.** Write today.

LOFTIS BROS. & CO.

THE OLD RELIABLE, ORIGINAL Diamond and Watch Credit House

Dept. E 840 100 to 108 N. State Street, CHICAGO, ILL.

Branch Stores: Pittsburgh, Pa., and St. Louis, Mo.

3 CUSTOM SHIRTS FOR $5.00

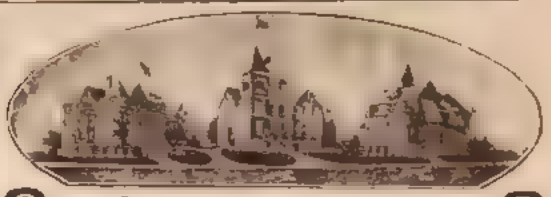
I make shirts that fit you because I make every garment from your measurements and guarantee to take them back if they do not. I

I send you 100 samples to select from

I send you the finest cloths in the world, with a measurement blank which explains how I send you the finished shirts express prepaid. No ready made shirts to sell you, but facilities unequaled to serve you with the highest grade of custom work. Write for my samples. Higher priced fabrics, too. Fall samples now ready. No agents.

CLARENCE E. HEAD Master of Shirtcraft

Railroad Street, Ithaca, N. Y.



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No more need to trudge along on a salary! We will start you in a business of your own, give you a chance to make more money than you ever thought of making before. And make it easily and quickly, too. We want good, energetic representatives all over the country to show our line of beautiful samples, and will pay you big money. We will give you exclusive territory. Write today.

This Handsome Suit FREE

And we will give you a handsome suit, to your special order, made of the finest cloth, absolutely free. The most handsome up-to-date, nobby suit made. People will see your suit, and you will have no trouble at all taking orders. Don't fail to send a post card or letter today calling for our complete line of samples and all accessories for taking orders and start right in business NOW.

EARN $30 TO $50 A WEEK

You can earn from $30 to $40 a week, easily and quickly. No trouble at all in taking orders by showing our nifty line of samples and snappy, latest styles. Or keep your present position and earn $20 to $75 a month on the side.

Write Today Don't delay. Write for full particulars of our free suit offer, and free outfit for starting right in to make big money today NOW.

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651 So. Fifth Ave. Dept. 44 Chicago

ILLINOIS

SENT FREE—NO PAYMENT DOWN

Best WATCH on Earth NOW SOLD ON CREDIT

For the first time in history the great, genuine *ILLINOIS* Watch is now sold by man on credit exclusively by us. This is the greatest public triumph of the age. It will revolutionize the Watch business. For over 40 years the *ILLINOIS* Watch has been acknowledged the *standard Watch worn by America's great men and women.* No man or woman should now be without a famous *ILLINOIS.*

Iron-Clad Guarantee

Part for part—in accuracy, wear, finish, beauty, material and workmanship, the *ILLINOIS* is *superior to any other Watch at any price.* *Both the makers and we stand back of this Watch with a guarantee that absolutely protects you.* We are one of the largest Watch Distributors in the world. For over 35 years we have sold all kinds of Watches, and honestly tell you that the *ILLINOIS* is the best at any price.

Take Your Own Time To Pay

NO MONEY DOWN

The famous *ILLINOIS costs you* less than inferior makes. *Nowhere else* can you buy a *genuine ILLINOIS* on credit. No dealer can undersell us even for cash. *Sent on approval*—you take no risk—*pay as you please.*

Handsome Book FREE

Our *free*, beautiful, *profit-sharing* book, describing the *ILLINOIS* Watch, easy credit terms, and reproducing many handsome styles, awaits you. Send name and address today.

FREDDRO WATCH CO., Dept. 304, St. Louis, Mo.

Successors to The American Watch Co., of St. Louis.

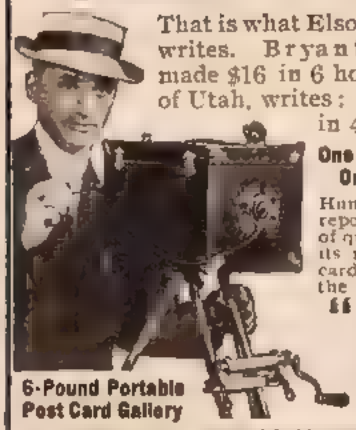
DIAMONDS·ON·CREDIT

20% DOWN—10% PER MONTH

J. M. LYON & CO. 71-73 Nassau St., N.Y.

2317 $25. 3291 $50 2315 $35. 2157 $25. 2156 $20 2110 $35 6252 $35. 3312 $35. 2159 $35. 2388 $40

$68.75 PROFIT IN ONE DAY



That is what Elson, of N. Dakota writes. Bryant of Colorado, made $16 in 6 hours. Sturgill, of Utah, writes: "I made $1200 in 4 months."

One Minute Post Cards—One Minute Profits

Hundreds of letters and reports tell the records of quick, big, easy profits making photo post cards the new way with the

"MANDEL" POST CARD MACHINE

6-Pound Portable Post Card Gallery

A new business with an unusual field for men and women. The chance for any man, young or old, with small capital to ESTABLISH NO EXPERIENCE own a business that will earn $2000 to $5000 a year. New discovery. A wonderful, simple process.

Photos Direct on Post Cards—No Plates No Films

The Mandel Post Card Machine takes finishes and delivers finished photo post cards a minute it sells ON THE SPOT at a profit of 500 per cent. Makes two sizes of post cards from a photo negative. This is not a tintype machine. Photo post cards popular everywhere. In the country, on the streets, at picnics, carnivals, fairs—the one minute post card means big demand and immediate money.

First sales from post cards shipped with the machine pay for it. Actual returns and money invested. Complete and simple instructions enable you to begin work from initially.

Write today for complete INFORMATION FREE. Address either office.

THE CHICAGO FERROTYPE COMPANY

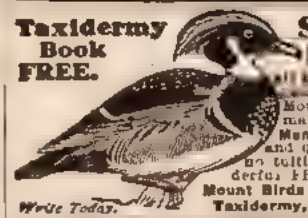
364 Ferrotype Bldg., Chicago, Ill. or Dept. 364 Public Bank Building New York, N. Y.

Advertising Men In Demand

Ask any of the large advertising agencies like Lord and Thomas, The Frank Presbrey Agency or the J. J. Gessler Company, regarding the demand for expert advertisement writers, and they will tell you that the demand for really A1 men exceeds the supply. If you have the advertising instinct you can qualify at home for a good position as advertising manager. Good advertising positions are open everywhere. Write to the I. C. S. today and learn of the way by which you can qualify. The I. C. S. Course covers everything from type to copy, planning a campaign. Finding out how the I. C. S. can help you costs nothing, and places you under no obligation. **Write now—right now.**

INTERNATIONAL CORRESPONDENCE SCHOOLS
Box 1003 A Scranton, Pa.

Taxidermy Book FREE.



Stuff Beautiful Birds. Learn by mail to stuff and mount all kinds of birds, animals, fish and game heads, make rugs, tan skins. Mount your own specimens and make money preserving for others. Men, women and boys learn easily and quickly. Success guaranteed or no tuition. Write today for our wonderful FREE book "How to Learn to Mount Birds and Animals." N.W. School of Taxidermy, 1107 Elwood Bldg., Omaha, Neb.

Write Today.

Learn Typewriting

Every business man and woman should be a typewriting expert. You can learn to master a typewriter at home through I. C. S. help. Course covers every branch of typewriter work from keyboard to card, office and law work. Has the last word on touch typewriting and tells you which one can most quickly and surely overcome. Free descriptive booklet. Write today.

International Correspondence Schools
Box 1003 I Scranton, Pa.

$-101 Two 1-4c dia $35. *Compl* $68.00
$-102, 1 2c dia. $45. *Complete* $86.50
$-103 3-4c dia. $67.50 *Complete* $74.50
$-104, Two 1 2c dia. $90; Compl. $95.00
$-105 1-8c dia $8.25, *Complete* $12.00
$-106, 1-4c dia $17.50, *Compl* $23.25
$-107, 1 2c dia. $45, *Complete* $48.75
$-108, 3-4c dia $67.50, *Compl* $71.25
$-109, 1c. dia. $87.50, *Compl* $91.25
$-110, 1-8c, dia. $8.25, *Complete* $10.50
$-111, 1-4c. dia. $17.50, *Compl* $22.50
$-112, 1-2c. dia. $45, *Complete* $47.75
$-113, 3-4c, dia. $67.50, *Compl* $72.50
$-114, 1c dia $97.50, *Complete* $99.25
$-115, 1 1-2c dia. $146.25 *Compl* $161.25

Genuine Perfect Cut Fine Solitaire DIAMONDS $66 TO $97.50 PER CARAT

World's Lowest Price and Safest Plan

$66 to $97.50 per carat for Genuine Perfect Cut Brilliant Diamonds of great perfection and beauty. We guarantee to buy back every diamond for Cash. We legally guarantee, in writing, carat weight, quality and value. All 18K solid gold mountings at actual manufacturing cost. Any diamond sent for you to inspect at our nearest express agent or bank at our expense. No deposit required. No obligation to buy. Full particulars of our wonderful low prices, plan and guarantees in the new complete

Basch Diamond Book FREE 100 pages, illustrated, art cover in rich colors, shows diamond jewelry, watches, gold, pearls and silver jewelry, etc. You cannot buy a diamond safely or intelligently without the valuable information in this big book. A copy for you if you send name NOW! *Write today!* Tear out this ad for reminder

L. BASCH & CO. DIAMOND IMPORTERS. Est. 1879. Dept. 1-963 S. State St. Chicago, Ill.

Pro-phy-lac-tic

Tooth Brush

Cleans **the teeth**
Cleans *all* the teeth
Cleans them *thoroughly*
"A clean tooth never decays"

The Pro-phy-lac-tic Tooth Brush gets around every tooth—between all the teeth, both back and front alike—thoroughly cleansing every crevice. Its curved handle gives direct access to every part of the mouth—the long end tufts reach every tooth in the head.

Every Pro-phy-lac-tic is fully guaranteed if defective we will replace it. Each is sterilized and in an individual yellow box, which protects against handling. Rigid or flexible handle.

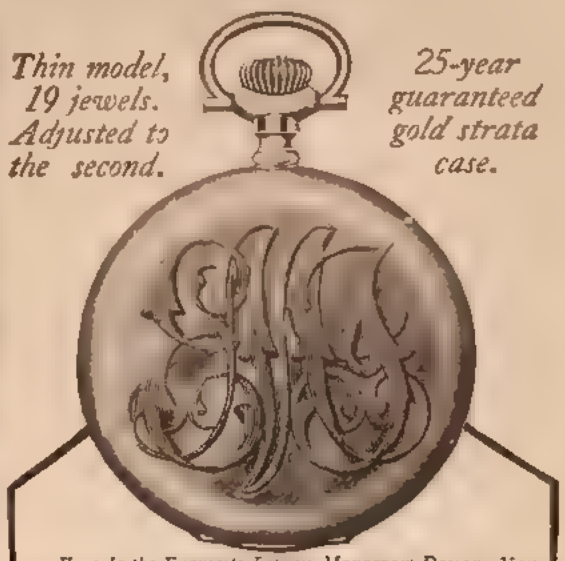
Our interesting booklet "Do you Clean or Brush Your Teeth" is yours for the asking. Send for it

FLORENCE MFG. CO.
57 Pine Street, Florence, Mass.
Sole makers of Pro-phy-lac-tic Tooth, Hair, Military and Cloth Brushes.

25c
35c
40c

Thin model, 19 jewels. Adjusted to the second.

25-year guaranteed gold strata case.



Here Is the Exquisite Ribbon Monogram Design You may have your own initial handsomely engraved by hand on the superb gold strata case—guaranteed for 25 years. Your choice of scores of other handsome designs.

Startling Watch Offer

The Great Burlington Special at the Rock-Bottom Price

The world's masterpiece of watch manufacture **now sold direct** to the consumer at the same price that even the wholesale jeweler must pay. The superb Burlington Special—adjusted to temperature isochronism and all positions, 19 jewels, fitted at the factory into the superb gold strata case—now sold direct to you at the rock-bottom anti-trust price.

The Fight Is On!

We will not be bound by any system of price-boosting contracts with dealers. We will not submit to any "high profit selling scheme." We will not be dictated to by ANY "system". **No matter what it costs, we are** determined to push our independent business even if we should have to fight a combination of all the watch manufacturers of the country.

And so we are making the most sweeping, astounding offer ever made on a high-grade watch. The famous Burlington direct and **at the same price wholesale jewelers must pay.** And in order to make the proposition doubly easy for the people we would allow it a rock-bottom price, if desired, on terms of **$2.50 a month.**

Get the Burlington Watch Co.'s Free Watch Book

Read our startling exposure of the amazing conditions which exist in the watch trade today. Read about the anti-trust fight. Read about our great $1,000 Challenge. Learn how you can judge watch values. Send your name and address for this valuable **FREE BOOK** now—TODAY. Sign and mail coupon.

BURLINGTON WATCH CO.
Dept. 10.
19th Street and Marshall Blvd.
Chicago Ill.

Burlington Watch Co., Dept. 1107, 19th St. and Marshall Blvd., Chicago
Please send me, without obligation and prepaid, your free book on watches with full explanation of your cash or $2.50 a month offer on the superb Burlington Watch.

Name .....

Address .....

No letter necessary, coupon will do.

This Diamond Sent to You Free

Not a cent down. Positively free delivery to you of your choice. Select any diamond from our great special offering. Our entire new importation offered at rock-bottom merchant prices. Save dealer's profit. Write for part cash of this sensational special sale.

Amazingly Low Prices

This special sale offers an unusual opportunity to all who appreciate the value of a splendid diamond investment. Don't wait until prices advance. Write for our big, special, illustrated, rock-bottom price list. Get our price guarantee. This is better than money in the bank to you. This is our greatest offer. Send for it today.

No Money Down

Keep your money in your pocket. See what a marvelous diamond value we offer. See the diamond first. Take it in your hands and examine it carefully, see its beauty for yourself. We stand back of the quality, and we stand back of the price value with our unlimited price guarantee.

Easy Payments

Take your time to pay. Get the diamond first. Have it, keep it and wear it before you pay for it. Your choice sent free for you to examine without a cent down. Our new easy payment terms and extremely liberal credit will surprise you. This is our amazingly liberal easy payment offer. Send for it.

Very Special

To all who will write promptly we will send our valuable booklet on "How to Judge a Diamond." Get this book and learn how to tell the grade, quality and value of a diamond. Post yourself on diamonds with this wonderful little book. Be your own diamond expert. Write promptly and we will send you a copy of this book positively free and postpaid, with all particulars of this great limited offer. Write today.

Olsen & Ebann Dept. 5152 **Chicago**

FOR the outdoor worker and every man who likes a warm, protecting winter underwear, there is none so satisfactory as

Lambsdown

Fleece-Lined Underwear

Its luxurious fleece lining wards off colds and promotes good health. Half the money spent for underwear would be saved if everybody bought *Lambsdown*. For it is one of the most durable underwears ever invented—*two seasons' wear to a garment*.

FOR MEN AND BOYS

At your dealer's in Separate and Union Garments, 50c, 75c, up. *Lambsdown* is one of the Bodyguard Underwears. Look for the Bodyguard Shield. It is your safeguard. *Write for Bodyguard Book No. S.*

UTICA KNITTING COMPANY
Utica New York

Makers of Bodygard Underwears, including Velastex, Twolayr, Springtex and Celtex.

Signal Detachable-Collar Flannel Shirt for Dress Wear

THE latest thing—and it's mighty comfortable and sensible too,—is the **Signal Detachable-Collar Flannel Shirt.** Wear it with the soft flannel collar or a stiff white one—you're well dressed for any occasion. Signal Flannel Shirts come in the snappiest patterns—in every color—with classy, double French cuffs and useful flap pockets. Besides, they are made for **long wear.**

Cut Coat Style—for your comfort

Open all the way down. Slip on or off as easy as your glove. The only thing for warm, solid comfort and real style for fall and winter wear.

Ask Your Dealer

to show you the new **Signal Flannels.** They're up to the high standard of the famous Signal Work-Shirts and Overalls and sell at $1.50 and $2.00. You can't beat the price or equal the shirt.

Be sure to ask your dealer to show you also, Signal Flannels with the attached "lay-down" and military collars. They're great for work—out-doors and in-doors—come in all colors and several weights at $1.00 to $3.00. Look for the Signal Trade Mark.

UNION MADE

SIGNAL SHIRT

Trade Mark

The Mark of "QUALITY"

The Hilker-Wiechers Mfg. Company
1252 Mound Avenue RACINE, WIS.

5c

Sixty Satisfying Cigarettes or Twenty Plentiful Pipefuls for a nickel!

QUEEN QUALITY
TOBACCO

There's a Queen in every port for the sailor lad who rolls his own cigarettes! She's in the Blue Bag—a fascinating lass—and she's true blue.

Queen Quality's the one best bet for *every* smoker who wants his the hand-made way. It's granulated—cut specially for rolling cigarettes and it is sweet, tasty and fragrant.

Economical, too! Every five-cent Blue Bag rolls you sixty satisfying cigarettes—just the way you want 'em—or turns you out twenty plentiful pipefuls.

Stop off at the next tobacco shop and get acquainted with the Queen. She'll be your "steady" after that.

Save the labels of The Blue Bag!

For the fronts of 25 Queen Quality Bags we'll give you FREE a handsome Silk Art Kerchief of varied colors and designs, beautiful for making bed spreads, pillow covers, kimonos, etc. (Offer expires June 30, 1913)

FR Penn Tobacco Company
The American Tobacco Company, Successors

FREE—A full-sized bag of Queen Quality—FREE

Let us give you a full-sized sample bag of Queen Quality Tobacco. Fill in the coupon at corner of this page and mail it to us TODAY!

CUT OUT — FILL IN — MAIL TODAY!

"Queen Quality" Department Drawer "S" Jersey City, N. J.

Please send free of all charge to me, a full sized sample Blue Bag of Queen Quality Tobacco. (Offer expires Dec. 31, 1913)

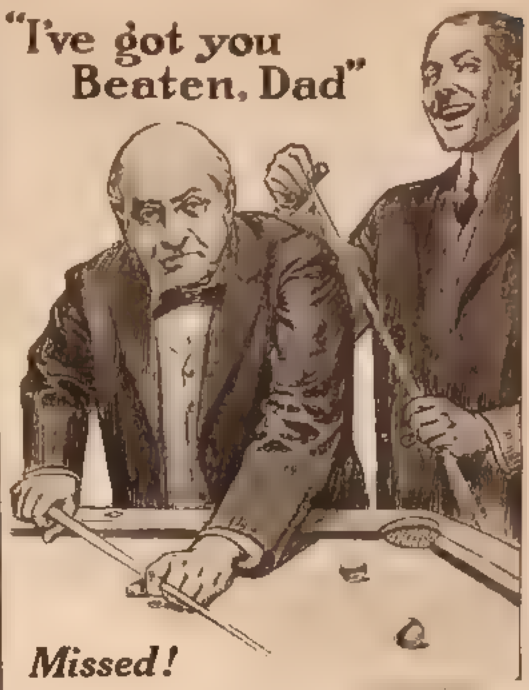
Name . . . . . .

Street . . . . . .

City . . . . . State . . . .

"Please introduce me to the Queen"

"I've got you Beaten, Dad"



Missed!

ONE poor shot and the game is lost! Such close, exciting situations are one reason for the intense fascination of Billiards and Pool—these fine, lively, home games which inspire the keenest sort of friendly rivalry.

You can play Billiards and Pool now without frequenting a public poolroom. You can have in your home a

BURROWES
Billiard and Pool Table

and play while you are paying for it.

No special room is needed. The Burrowes Table can be set on your dining-room or library table, or mounted on its own legs or compactly folding stand. Only a moment is required to set it up, or to take it down and set it out of the way. Sizes range up to 4½ x 9 feet (standard). Complete playing equipment of balls, cues, etc., free with each Table.

Burrowes Tables are used for home practice by some of the foremost professionals. Every Table of whatever size is scientifically accurate in proportions, to the smallest detail, and adapted to the most expert play. The most delicate shots, calling for skill of the highest type, can be executed with the utmost precision.

$1.00 DOWN

Prices are $15, $25, $35, $45, $55, $65, $75, etc., on terms of $1 or more down and a small amount each month.

FREE TRIAL—NO RED TAPE. On receipt of first installment we will ship Table. Play on it one week. If unsatisfactory return it, and on its receipt we will refund your deposit. This ensures you a free trial. Write today for catalog illustrating and describing the Tables, giving prices, terms of payment, and all other information.

The E. T. Burrowes Co.
171 Spring Street Portland, Me.

Write for Free Catalog

SEND ONLY

50c and We Ship You This Superb Rocker!

Yes, only 50c and we ship you this magnificent Rocker. Only 50c down and then $2 per month—$46.95 made for this special offer. **Positively the greatest bargain ever offered here or at any other place.** Write for free catalog and bargain list today. We defy any house in America to equal our special offers. You can see for yourself what an elegant rocker this is. It is made in Antique Quarter-sawed Oak finish. Has high back, cleverly ruffled with rosettes. Handsomely upholstered. Profusely carved back and front posts. Upholstering throughout in best grade of Imitation Leather. Padded seat with ruffled and rosette edge. Shipped from factory. **No A1291.** This is but one of the special bargains we are now giving. **Send for this bargain list today.**

Easy Payments

The great house of Straus and Schram, with a proud quarter century record, **endorsed by the greatest bank,** will trust you and allow you to buy on the easiest monthly payments. If you want anything in Furniture, Carpets, Rugs, Draperies, Curtains, Sewing Machines, Crockery, Silverware, Baby Carriages, Go-carts, Men's, Women's and Children's Apparel, Stoves, Ranges, Pianos or any other article of household furnishings, don't fail to get our easy terms.

FREE Special Bargain List and Catalogs

Don't wait a minute before sending for our great 532 page catalog and special month's bargain list. Bargains which are positively astounding. Bargains which simply cannot be met by our competitors because of our stupendous buying and manufacturing facilities.

FREE COUPON

STRAUS & SCHRAM (INC.)
DEPT 9107 35TH ST CHICAGO, ILL.

WRITE TODAY, DON'T WAIT

Send me free ... This month only. ...

☐ General House Furnishings ☐ Stoves & Ranges
☐ Ladies' Clothing ☐ Men's Clothing

STRAUS AND SCHRAM (Inc.)
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35th St.
CHICAGO

Name to ....
Address ....
Shipped at once ....

Send for FREE Catalog!

showing wonderful White Valley Gem Rings (Ladies' or Gentlemen's), Scarf Pins, Studs, Brooches, Necklaces, Cuff Buttons, Lockets, Earrings—100 different articles and styles.

You have never seen anything like it. Get the **beautiful, splendid gems.** We take Sapp responsibility for ... look like finest diamonds. Wear ... with pride, and not a ... Send ... test. Let us ... money when ... White Valley Gems for ... Satisfaction ... we will be ... to you.

14 K. solid gold ... rings ... per Gem in Ce... with each ... Let us ... Write ... Gem CO. D. ... the ... to ... Mine ... Send ... Write ...

WHITE VALLEY GEM CO.
504 Saks Bldg. Indianapolis, Ind.

A Marvelous Synthetic Gem
Not Imitation

—the greatest triumph of the electric furnace. *Will cut glass.* Stands fire and acid tests like a diamond—guaranteed to contain no glass. Remoh Gems have no paste foil or backing, their Brilliancy is guaranteed forever. One-tenth the cost of a diamond. These remarkable gems are set only in 14 Karat Solid Gold Mountings.

Sent On Approval Anywhere In U. S.
—your money cheerfully refunded if not perfectly satisfactory. Write for our 4-color De Luxe Jewel Book—yours for the asking. Address

Remoh Jewelry Co.,
610 Washington Ave., St. Louis

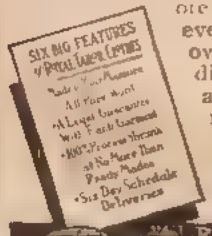
COPYRIGHT 19.. THE ROYAL TA.. ...

It's Your Move

—to get in the King-Row of "Royal-Tailored Men"

Here it is again—this everlasting clothes question—nudging you once more with the need for a new suit or overcoat. ¶How are you going to answer the call this Fall? (1) By the Grab-Bag system of slipping into the first convenient store, and slipping out again in a pot-luck-chosen, take-it-as-it-is-garment. OR—(2) By the Royal Tailored-to-order System of having every detail of your suit or overcoat built exactly as you dictate it—of having it fabric and fashion moulded to your idea and identity. It means Uncertainty *versus* Certainty. And the price, in either case, is about the same

For, note you this remarkable fact—Real Tailored-to-order clothes, by the Royal System, cost no more than the slipped-from-the-shelf kind. $20, $25, $30, $35 gives you, thru Royal Service, the world's best made-to-order workmanship



"A Royal Dealer in Your Town Means a Broadway Tailor Shop Within Walking Distance"

THE ROYAL TAILORS

Chicago *Joseph Wilson President* New York

"$1 a Day Forfeit for Each Day's Delay When a Garment Order Isn't Finished On Time"

Your Telephone Horizon

The horizon of vision, the circle which bounds our sight, has not changed.

It is best observed at sea. Though the ships of today are larger than the ships of fifty years ago, you cannot see them until they come up over the edge of the world, fifteen or twenty miles away.

A generation ago the horizon of speech was very limited. When your grandfather was a young man, his voice could be heard on a still day for perhaps a mile. Even though he used a speaking trumpet, he could not be heard nearly so far as he could be seen.

Today all this has been changed. The telephone has vastly extended the horizon of speech.

Talking two thousand miles is an everyday occurrence, while in order to see this distance, you would need to mount your telescope on a platform approximately 560 miles high.

As a man is followed by his shadow, so is he followed by the horizon of telephone communication. When he travels across the continent his telephone horizon travels with him, and wherever he may be he is always at the center of a great circle of telephone neighbors.

What is true of one man is true of the whole public. In order to provide a telephone horizon for each member of the nation, the Bell System has been established.

AMERICAN TELEPHONE AND TELEGRAPH COMPANY
AND ASSOCIATED COMPANIES

Every Bell Telephone is the Center of the System.

Is the Money Always There?

Your special training—or lack of it—hits you right in the money pocket. If you're not earning enough to ***more*** than make both ends meet, or if the work you're doing is uncongenial, ***now*** is the time to right these conditions by acquiring the special training that will make you successful and happy.

Select from the attached coupon the particular occupation you like best, mark the coupon as directed and mail it today. That's all you have to do to learn ***how*** the International Correspondence Schools can train you at home and in your spare time—no matter where you are, what you do, or what your age. ***If you can only read and write, the way is open.***

You can't afford to overlook this opportunity to increase your salary and better your position. Mark and mail the coupon NOW.

INTERNATIONAL CORRESPONDENCE SCHOOLS
Box 1003, Scranton, Pa.

Please explain, without further obligation on my part, how I can qualify for the position, trade or profession before which I have marked X.

General Foreman	Electrical Engineer
R. R. Shop Foreman	Machine Designer
R. R. Traveling Eng.	Electrician
R. R. Trav'g Fireman	Mining Engineer
Locomotive Engineer	Mine Foreman
Air-Brake Instructor	Foreman Machinist
Air-Brake Inspector	Chemist
Air-Brake Repairman	Assayer
Mechanical Engineer	Architect
Mechanical Draftsman	Bookkeeper
R. R. Construction Eng.	Stenographer
Surveyor	Advertising Man
Civil Engineer	Automobile Running
Banking	Concrete Construction

Name.....

Employed by..... R. R.

Employed as.....

Street and No.....

City..... State.....

"Here's what keeps us well and happy!"

WHEN the Campbell kids say this they are also speaking for a great multitude of other healthy happy youngsters everywhere, whose energy and good spirits are promoted by

Campbell's TOMATO SOUP

So tempting, so nourishing, so easy to prepare and so handy to serve, this wholesome soup invigorates the appetite and the digestion; and does a large part in the regular building-up of strong bodies and cheerful minds.

It is equally satisfying to young and old. The happy Campbell Kid Family includes all ages of people who know what is good. Are *you* one of them? If not, you'd better join *today*.

Caroline Cutter
Is all in a flutter
With *Campbell Soup* visions
Too joyful to utter.

21 kinds 10c a can

Asparagus	Clam Chowder	Pea
Beef	Consommé	Pepper Pot
Bouillon	Julienne	Printanier
Celery	Mock Turtle	Tomato
Chicken	Mulligatawny	Tomato-Okra
Chicken Gumbo (Okra)	Mutton Broth	Vegetable
Clam Bouillon	Ox Tail	Vermicelli-Tomato

Look for the red-and-white label

The Importance of Training

Here is a man who was in line for a better job, but, like the great majority, had not been training himself to "fill the shoes" of the man above him; he always thought that if the time ever came he could just bluff it through—special training wasn't necessary. There's where he made *his* mistake, and there's where you will make *your* mistake if you are not a trained man. The boss had only to ask a few questions to find that the man did not know anything about the other fellow's work; that he had been wasting his time instead of improving it—that he was just one of the fellows who get into a rut and stick because he didn't have sense enough to plan for the future.

The time to plan is right now; the opportunity will come when you are ready

Don't think, as this man did, that it is simply a matter of absorbing knowledge and as a matter of course promotion will follow. Don't argue with yourself "There's no opportunity here—no incentive to do better work—I have gone as high as I can in this firm—I know as much as the boss and don't see why I can't get the money."

If the opportunity for advancement is not right ahead of you with your own firm, then it *is* with another. There is always an opportunity—always a chance for a better job, for better pay—yes, just the job you have often wished you had—but mere wishing will never get you anywhere; you *must* get the training.

The American School of Correspondence was founded to help just such men as you. It is one of the largest educational institutions in the world. If you will write and tell us what you want to be, how much of an education you already have, and how much time each day you are willing to devote to bettering your condition, we will send you, absolutely free of charge, our complete bulletin describing sixty-five courses of study. We will tell you how you can pay for the course you want by the week or by the month. We will do everything we can to get you started right.

If anyone offered you $500 for two hours overtime every day for a year, you would jump at the chance, wouldn't you? Two hours study every day for the next year or two will mean more than $500—it may mean $1,000; that depends entirely upon yourself.

The American School does not employ agents or collectors to bother you in your home or at your work. It brings a complete college course to you in your own home, and all work is carried on privately and quietly, strictly by correspondence.

Won't you check, fill in, and mail the coupon?

AMERICAN SCHOOL OF CORRESPONDENCE
CHICAGO, U. S. A.

Opportunity Coupon

American School of Correspondence, Chicago, U. S. A.

Please send me your Bulletin and advise me how I can qualify for the position marked "X." H. R. Mass., 10-19.

.....Automobile Operator	.....Lawyer
.....Draftsman	.....Fire Ins. Engineer
.....Architect	.....Telephone Expert
.....Building Contractor	.....Moving Picture Op'r
.....Structural Engineer	.....Bookkeeper
.....Civil Engineer	.....Stenographer
.....Electrical Engineer	.....Accountant
.....Elec. Light & Power Supt.	.....Cost Accountant
.....Master Mechanic	.....Cert'd Public Acc'nt
.....Sanitary Engineer	.....Auditor
.....Steam Engineer	.....Business Manager
.....Reclamation Engineer	.....College Preparatory

NAME .....

ADDRESS.....

To-night!

Velvet

THE SMOOTHEST TOBACCO

—and as you sit there under the lamp just let this thought sink in: Your choice of tobacco—perhaps more than anything else—may add keen edge to your evening's enjoyment.

Smoothness! That's the thing. It's smoothness that makes us forget the *tobacco* to revel in the goodness of the *smoke* itself. A vast and increasing army of men now choose Velvet.

Perhaps you, too, will find that you like it better than the tobacco you've been liking best. Your dealer sells Velvet.

Full size 2-ounce Tins, 10c.
Convenient 1-ounce Bags, 5c.

Liggett & Myers Tobacco Co.

THE MUNSEY PRESS, NEW YORK.